



Learning and Labor.

LIBRARY

OF THE

University of Illinois.

CLASS.

BOOK.

VOLUME.

572.05 FA 1

Books are not to be taken from the Library.

SOCIOLOGY

Accession No. 40937

DEPARTMENT



FIELD COLUMBIAN MUSEUM

PUBLICATION 8.

ANTHROPOLOGICAL SERIES.

VOL. I, No. I.

ARCHEOLOGICAL STUDIES

AMONG THE ANCIENT

CITIES OF MEXICO

BY

WILLIAM H. HOLMES,

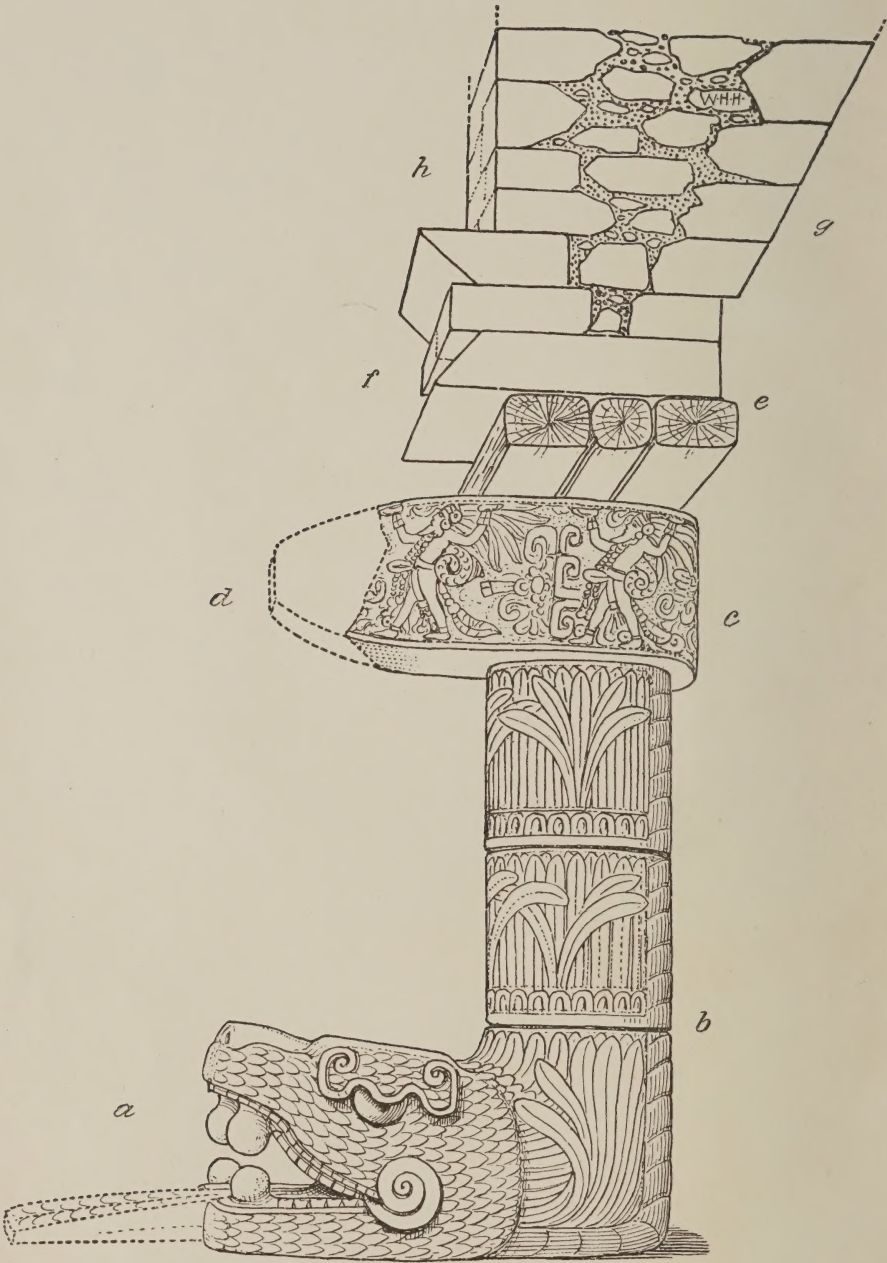
Curator, Department of Anthropology.

PART I, MONUMENTS OF YUCATAN.



CHICAGO, U. S. A.

December, 1895.



THE FEATHERED-SERPENT COLUMN OF CHICHEN-ITZA.

PL. I. THE FEATHERED-SERPENT COLUMN OF CHICHEN-ITZA.

Restoration made from mutilated examples.

Two of these columns are placed in each principal portal, facing outward. The end of the tongue extends forward on the narrow terrace nearly to the head of the stairway.

- a.* Base (head of serpent) resting on temple floor.
- b.* Shaft (body of serpent) with feather decoration.
- c.* Capital (tail of serpent) with atlantean figures in relief supporting the lintel.
- d.* Tail of serpent, broken off in principal examples, but probably tipped, originally, with sculptured rattles.
- e.* Three lintel timbers cut midway in their length.
- f.* Three-membered molding—archaic cornice—about midway in height of building.
- g.* Soffit or incline of arch of vestibule.
- h.* Decorated zone of entablature, 56 inches wide to upper moldings.

ARCHEOLOGICAL STUDIES
AMONG THE
ANCIENT CITIES OF MEXICO.

BY WILLIAM H. HOLMES.

PART I.

CONTENTS, PART I.

	PAGE
Preface, - - - - -	7
Itinerary, - - - - -	9
Introduction, - - - - -	15
Ruins of Eastern Yucatan, - - - - -	57
Mugeres Island, - - - - -	57
Island of Cancun, - - - - -	63
Island of Cozumel, - - - - -	64
El Meco, - - - - -	69
Tuloom, - - - - -	75
Ruins of Middle Northern Yucatan, - - - - -	79
Mounds at Progreso, - - - - -	79
Uxmal, - - - - -	80
Izamal, - - - - -	97
Chichen-Itza, - - - - -	101

ILLUSTRATIONS, PART I.

PLATE		Opposite page
I.	Feathered-serpent column, Chichen-Itza, - - - - -	3
II.	Hewn stone showing tool marks, Chichen-Itza, - - - - -	30
III.	Ruined temple, south end of Mugeres Island, - - - - -	62
IV.	Portal of small temple, Island of Cozumel, - - - - -	66
V.	Portion of sculptured façade, Governor's Palace, Uxmal, - - - - -	92
VI.	Middle portion of the House of the Pigeons, Uxmal, - - - - -	94
VII.	Inscribed column, Uxmal, - - - - -	96
VIII.	Map of Uxmal, - - - - -	96
IX.	Panoramic view of Uxmal, - - - - -	96
X.	East façade and Iglesia, Palace, Chichen-Itza, - - - - -	112
XI.	A characteristic Maya vaulted chamber, Palace, Chichen-Itza, - - - - -	114
XII.	Graphic Section of Round Tower or Caracol, Chichen-Itza, - - - - -	118
XIII.	View of Temple of Tigers and El Castillo, Chichen-Itza, - - - - -	122
XIV.	Main portal of El Castillo, Chichen-Itza, - - - - -	126
XV.	Sculptured sanctuary, Temple of the Tigers, Gymnasium, Chichen-Itza, - - - - -	132
XVI.	Square columns, Temple of the Tables, Chichen-Itza, - - - - -	134
XVII.	Sketch map of Chichen-Itza, - - - - -	138
XVIII.	Panoramic view of Chichen-Itza, - - - - -	138

FIG.	PAGE
1. Examples of Yucatec terraces and pyramids, - - -	33
2. Specialization of ground plan of Maya temples, - - -	35
3. Examples of Maya buildings, - - -	37
4. Cord holders, - - -	38
5. Section of a Yucatec building, - - -	41
6. Exterior doorway with stone lintel, - - -	43
7. Interior doorway with wood lintels, - - -	43
8. Exterior doorway with single column and stone lintels, - -	44
9. Exterior doorway with two columns and wood lintels, - -	44
10. Examples of minor wall openings, - - -	45
11. Examples of Maya arches, - - -	51
12. Map of the shore and islands of Northeastern Yucatan, - -	56
13. South end of Mugerres Island, showing ruins, - - -	58
14. Plan of small structure, south end of Mugerres Island, - -	59
15. Plan of temple, south end of Mugerres Island, - - -	59
16. Section of temple, south end of Mugerres Island, - - -	61
17. Plan of small temple, Island of Cozumel, - - -	65
18. Section of small building at Cedral, Island of Cozumel, - -	67
19. Archway in quadrangular ruin at Cedral, Island of Cozumel, - -	67
20. Pyramid-temple at El Meco, mainland of Yucatan, - - -	71
21. Plan of temple at El Meco, mainland of Yucatan, - - -	71
22. Section of summit-temple at El Meco, mainland of Yucatan, -	72
23. Tuloom from the sea, mainland of Yucatan, - - -	76
24. Panorama of Tuloom and the shore to the north, - - -	77
25. Section of Temple of the Magician, Uxmal, - - -	85
26. Section of Governor's Palace, Uxmal, - - -	91
27. Gigantic stucco head, east base of Pyramid, Izamal, - - -	99
28. Stucco figure, west side of Pyramid, Izamal, - - -	99
29. Southwest corner of Palace, Chichen-Itza, - - -	107
30. Plan of Palace, Chichen-Itza, - - -	107
31. Section of Palace, Chichen-Itza, - - -	111
32. Section of larger annex, Palace, Chichen-Itza, - - -	112
33. Section of the Round Tower or Caracol, Chichen-Itza, - -	117
34. Plan of the Round Tower or Caracol, Chichen-Itza, - - -	117
35. Section of El Castillo from north to south, Chichen-Itza, -	123
36. Section of El Castillo from east to west, Chichen-Itza, - -	125
37. Plan of El Castillo, Chichen-Itza, - - -	125
38. Section of Temple of the Tigers, Gymnasium, Chichen-Itza, -	129
39. Plan of Temple of the Tigers, Gymnasium, Chichen-Itza, - -	131
40. Sketch of fallen column, Temple of the Tables, Chichen-Itza, -	134
41. Stone table supported by human figures, Temple of the Tables, Chichen-Itza, - - -	135

PREFACE.

In December, 1894, a number of gentlemen, representing different branches of scientific research, were invited by Mr. A. V. Armour to accompany him in his steam yacht *Ituna* on a voyage to Mexico. Three months were spent in that most interesting country, mainly in the states of Yucatan, Chiapas and Oaxaca. The writer was a member of the party and, as Curator of Anthropology in the Field Columbian Museum, was expected to examine and describe such archeologic remains as happened to be encountered during the journey. The following report, issued for convenience in two parts, is the result. Besides this a short paper treating of the geology, and particularly of the cenotes or natural wells of Yucatan, will appear in the *Journal of Geology of the University of Chicago*.

The author desires to express in this place his many obligations to his associates on the voyage for generous assistance, and especially to thank Mr. Armour and the President and Director of the Museum for the opportunity afforded of visiting this most important field of research.

The present paper is the first number of the *Anthropological Series of the Museum Publications*. It will be followed by a second number continuing the same subject and by a third treating of the *Ceramic Art of Mexico*. These, with possibly some additional matter relating to the same general region, will, it is expected, constitute the larger part, if not all, of the first volume of the series.

ITINERARY.

VOYAGE OF THE YACHT ITUNA.

The yacht Ituna sailed from New York, December 16th, 1894, bound for Havana and the Atlantic ports of Mexico. She was in charge of her owner, Mr. Allison V. Armour, who had with him as a guest Mr. Norman Williams of Chicago. At Jacksonville, Florida, the party was augmented by the arrival of Professor Allan Marquand of Princeton, Dr. Charles F. Millspaugh, Curator of Botany in the Field Columbian Museum, and Mr. William H. Holmes, Curator of Anthropology in the same institution. Christmas was spent in Havana, and on the 30th of December the yacht was anchored off the port of Progreso, Yucatan. At this place Mr. Edward H. Thompson, ex-U. S. Consul at Merida, and a well-known student of archeology, joined the party. With this port as a basis of operations, visits were made to numerous localities on the peninsula of Yucatan and in Mexico proper, three months of the winter season being devoted to the study of the Botany, Geology, Anthropology and Natural History of these most interesting regions.

The first voyage was toward the east, and visits were made to the islands of Contoy, Mugerres, Cancun and Cozumel and to the mainland of Yucatan, opposite these islands. This part of Yucatan has rarely been visited either by travelers or by students of the history and resources of the country. Both the islands and the mainland appear to be covered with dense forests, save for occasional low limestone bluffs and strips of sand along the beaches, and present a most monotonous appearance; but the region is rendered extremely interesting by its archeological remains, encountered at every turn, its peculiar geological formations, its almost unstudied botany and the marvelous transparency and iridescent beauty of its island-enclosed waters. Nearly two weeks were spent in cruising about from place to place, the Indian villages of Dolores, on Mugerres Island, and San Miguel, on Cozumel, being made the basis of operations. Before leaving these waters a run was made down the coast to secure a glimpse of the great ruin of Tuloom, now occupied by hostile Indians as an outpost. We were not permitted to land by our guest

and adviser, Don Jose Dolores Perez of San Miguel, and contented ourselves with a distant survey of the imposing walls of the principal ruin, which resembles a fortress crowning the high bluff facing the sea.

Returning to Progreso on the 12th of January, preparations were made for a month's excursion into the interior of Yucatan. From Merida visits were made to Tikul, Uxmal, Izamal and Chichen-Itza. The visit to Uxmal was all too brief for the examination of its splendid remains, but the spot is so fever-stricken even in winter that our most experienced advisers declared the risk too great to spend even a single night there. At Izamal several massive ruins, mostly pyramidal bases of ancient temples, rise in the midst of the modern town, breaking up its monotony and affording excellent foundations for its dwellings and churches. Here the party received most acceptable hospitality at the hands of Dr. George F. Gaumer, an American resident of the village. In Chichen-Itza, the most important group of ruins in Yucatan, a week was spent and careful studies were made, ample facilities being furnished by our associate, Mr. E. H. Thompson, proprietor of the fine hacienda on which the ruined city stands. On returning to Merida we were compelled to say farewell to Professor Marquand, who had to return to his duties at Princeton, and to Dr. Millspaugh, who was so disabled from an accident that he found it necessary to give up further field work. Mr. Williams had returned to the north from Havana.

Sailing again from Progreso on January 27th, the yacht was next anchored in the port of Laguna or Carmen, in the State of Campeche on the southern margin of the Gulf. Desiring to visit the famous ruined city of Palenque, situated sixty miles to the south in the State of Chiapas, we took a steamer that plies between Laguna and the middle Usumacinta river, and carrying along with us the Ituna's gasoline launch we arrived the next day at the entrance to the Rio Chiquito. Here the launch was brought into use, and passing down the latter stream and into the narrow canal-like branch called Catasaha we reached at night-fall the head of launch navigation. This day's journey was rendered memorable by the occurrence of several novel incidents. Animal life is exceedingly abundant in and along all of these winding streams, and increases as the sources are approached. Turtles, alligators, lizards, fish and birds were constantly in view. Vast numbers of cranes, herons, flamingos, cormorants, kingfishers, hawks and the like were assembled to prey upon the fish, which are very plentiful and so bold as to be troublesome to travelers by water. One variety of fish of large size, weighing in some cases as much as fifteen or twenty pounds, and called by the natives the "Sabalo," was addicted to jumping, and in the evening the water fairly boiled with

them. Their spring was so powerful and at such eccentric angles that it was dangerous to remain near the sides of the boat. Members of the party were struck with such great force that we were glad of the opportunity to tie up for the night before a group of squalid Indian huts. Taking a dugout canoe from this point, the Catasaha lagoon was entered in the early morning, and a landing was made on the muddy margin of the south shore. From this point the village of Las Playas was reached by a walk of three miles over green meadows which, during the wet season, are covered by the shallow waters of the lagoon. At this pleasantly situated village we were hospitably entertained by the leading citizen of the place, Don Carlos Diaz, who kindly secured the men and animals necessary for continuing our trip to the base of the mountains.

Following neglected roadways and obscure trails through dense tropical forests, and over a meadow region of great beauty from which the blue mountain ridge of Tumbala was always in view, a ride of thirty-five miles brought us to the romantic village of Santo Domingo del Palenque. On the following day a ride of eight miles to the southwest, through dense and magnificent forests and across low foot hills and fresh mountain streams, brought us to the base of the mountain slopes. Here we began at once to encounter ruined walls, roadways, bridges and temples, and after a rough, precipitous climb of half a mile up the side of the unique cascades of the Otolum we reached the great ruin called the Palace. In this place we encamped four days, making such examinations of the numerous remarkable ruins as the time would permit. On the 8th of February rain set in, and our ride back to the village was through one of the heaviest down-pours encountered in many years of travel.

Reaching the village of Catasaha it was found that the heavy rains had flooded the meadows and it was with much difficulty and by wading the deeper channels that we reached the border of the lagoon proper. Here our friend Don Carlos had provided a canoe, and by dark we were in our launch and threading our way down the crooked branches to the Usumacinta. With Mr. Armour at the helm we sailed all night, encountering numerous adventures both trying and amusing, and at daybreak reached the village of Palisada. Taking a cup of chocolate in the market place we were again on the way at sunrise, and passing down the Usumacinta and Palisada rivers and through the lagoon, we arrived safely on board the Ituna at Carmen, at five o'clock in the afternoon. As a storm was raging on the Gulf outside, it was decided to remain in port until it subsided, and during the stay of three days our party was most hospitably entertained by the American Vice-Consul, Mr. Herman Hahn. Receiving advices

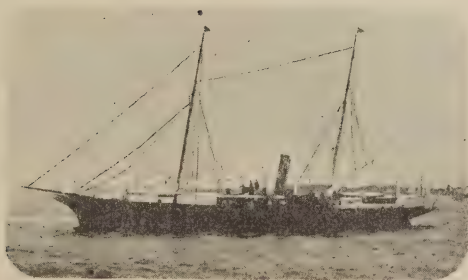
from the officers of the port that the storm was over and the passage of the bar possible, the *Ituna* sailed out over a charming sea, to encounter before midnight one of the severest "Northerners" on record. It was the southern extension of the storm that gave New Orleans ten inches of snow. We were bound for Coatzacoalcos, the northern terminus of the Tehuantepec railway, a sail of about twelve hours from Carmen, but the little ship was tossed about for three days in a heavy sea, and at the end of that time, finding it impossible to enter the port on account of the heavy breakers across the bar, we steamed away for Vera Cruz. We approached that city in the early morning, witnessing the sun-rise glow on the great snow-capped cone of Orizaba. The pleasure afforded by this episode was rendered keen by its sharp contrast with the somber experiences of the voyage. The failure to get into the harbor of Coatzacoalcos was greatly regretted, as much pleasure and profit were anticipated from the proposed trip by the newly finished transcontinental railway to Tehuantepec, on the Pacific coast.

From Vera Cruz the party, consisting of Mr. Armour, Mr. Thompson and the writer, set out by way of Puebla to Oaxaca. On February 21st we passed through the two wonderful cañons threaded by the Mexican Southern Railway, observing the remarkable exposures of geological formations everywhere so complete that the geologic history of the region could be read as from an open book. At sunset the continental divide was reached, and a descent of two hours into the Oaxacan valley brought us to the metropolis of southern Mexico. The city of Oaxaca is unique and exceedingly interesting, the result of its exceptional isolation from the outer world previous to the completion of the railway two years ago. It is laid out in the midst of a broad, smooth, fertile valley, bordered and apparently completely surrounded by magnificent mountain ranges. Seen from the neighboring heights, with its out-lying villages set in fringes of green, bordered by far-reaching russet slopes which grade imperceptibly upward into blue mountains, it presents a sight never to be forgotten.

From Oaxaca two of the most noted ruin-groups of Mexico were reached. By stage twenty-nine miles to the southeast on the Tehuantepec highway we reached Mitla, a marvelous city now built over by a modern Indian village, and, with the exception of a half-dozen of its greatest temples, practically destroyed. Here a week was spent with exceptional profit, and a visit was made also to the ancient quarries on the mountain side and to a fortified hill near by. On the return to Oaxaca the writer visited Monte Alban, a few miles west of the city. It is a mountain ridge a thousand or more feet high, one mile long and less than a quarter of a mile wide, which has been remodeled by the hand

of man into terraces, plateaus and pyramids. As it stands today it is in its outlines an artificial mountain and an astounding monument to the energy and culture of the ancient races. At both Oaxaca and Mitla interesting collections were made of the art productions of the native people who still practice, with little modification, a number of their aboriginal arts.

From Oaxaca the party returned to the north, visiting Puebla and the City of Mexico. At the latter place examinations were made of the slight remaining traces of the ancient Tenochtitlan, consisting of a body of refuse over twenty feet in depth exposed in the excavations from which adobe is obtained for brick-making in the suburbs of the modern city. Later on an excursion was made to San Juan Teotihuacan, twenty-five miles north of Mexico, which is probably the greatest monument of ancient American enterprise and culture in existence. March 7th, the party, augmented in Mexico by the addition of Mr. Samuel C. Peck and his brother and Mr. Marshall Miller, returned to Vera Cruz and sailed first to Progreso to leave Mr. Thompson, who resides in Merida, and then crossed to New Orleans, where the writer left the party and returned to Chicago with such collections as had been made. Mr. Armour after a few days continued the journey by way of Havana, Nassau and Charleston to New York.



INTRODUCTION.

The present paper does not assume to be more than a sketch of limited portions of a great subject. It aims only to present the various ruined cities and archeologic sites visited as seen at a passing glance—a glance by far too brief for complete or satisfactory observation, but which, nevertheless, has given vivid and valuable impressions. The studies which shall cover this ground adequately and finally are yet to be made. Years of patient study, excavation, comparison and literary research are necessary to the elucidation of each great site. Many years must pass before exhaustive exploration is even attempted in more than a very few cases, for the Mexican government does not encourage its own people in this work and is loth to entrust it to others.* Owing to these conditions I regard it as the duty of those favored with even a glimpse of the crumbling remains to publish what they observe, though it be at the risk of some repetition. In this way the sum of information is augmented by small increments, and in time a large body of congruous data will be acquired, serving in a way the purposes that would be better subserved by systematic research. Most of the ruins examined on this voyage of exploration have been visited before, and some have been studied with considerable care by such students as Stephens, Charnay, Le Plongeon, Maudslay and Bandelier, as well as various early explorers, but the examinations in no case approach completeness, and even the surface phenomena are as yet but half explored. No attempt will be made here to review the literature of the subject as it is quite extensive, besides this very important work has been pretty thoroughly done by several writers and especially by Bancroft, who has compiled an extensive and valuable bibliography.

PANORAMIC VIEWS, ETC. I had designed something considerably more ambitious in the way of panoramic views than it has been possible to present. Being unable to secure a skilled draughtsman, I was compelled to do the drawing myself, and haste and lack of skill in architectural work have left me with the merest sketches; these

* I do not mean by this observation to imply a criticism of the manner in which the Mexican government has treated this subject. It has probably done all it could in appointing custodians of important ruins and by forbidding the removal of relics from the country. Though our own government has expended money freely in the study of its primitive peoples and art, it has done less than Mexico in caring for its monumental remains and in preventing the removal of minor works of art to trans-Atlantic museums.

will, however, serve a good purpose in connection with the brief descriptions given in the text, as the reader will be able at once to locate each ruin and to comprehend its relations with the whole group. For detailed study it will be necessary to resort to photographs and to previously published illustrations. Owing to the rapidity with which the reconnaissance was made, many parts of the views are left somewhat indefinite, and occasionally parts are introduced from descriptions of others. A satisfactory panoramic view cannot be given until the artist has had the opportunity of examining all the monuments, great and small, in the minutest detail, thus making himself independent of mere isolated and much obscured views. The most careful drawing, representing merely what appears above the foliage and debris, would be of little avail. I have, therefore, in the case of the Yucatec cities, undertaken to represent the subjects as they would appear with the forests in a great measure removed. The cities are set in the midst of the great plain pretty much as if a fire had recently swept the country leaving the various buildings exposed. In many cases, also, where accumulations of debris obscure easily determined outlines and forms, I have ignored them, as, for example, around the base of the turret and the terraces of the Caracol in Chichen. On the whole, though imperfect in many respects, the views may be said to represent the ruins pretty nearly as they are to-day, though not exactly as they appear. Maps are in all cases placed in conjunction with the panoramas, so that it is only necessary to glance from one to the other to discover relative positions and dimensions, and to locate such descriptions and detailed studies as may be at hand. The maps are compiled from all available sources and make little pretensions to absolute accuracy. Where old maps were used I have corrected and added quite freely from my own observations. Though no systematic survey was made in any case, the compass and tape-line were constantly in use, and the maps of Palenque and Mitla, (Part II), are constructed wholly from my own notes. The maps and all other illustrations, save the photographs, were drawn by myself, and, I regret to say, exhibit many evidences of haste and lack of skill. Although there are at hand an unlimited number of photographs and sketches, I have inserted only such as seemed the most essential illustrations of what I have to say, and the future writer of monographic studies will still have an endless variety of unpublished subjects to draw upon.

The measurements of ruins and architectural features given are far from satisfactory. I found the measurements of those who had preceded me far from reliable, and I reached the conclusion that hurried and unverified observations must necessarily be wrong in

a large percentage of cases. My own figures as well as those of others are, therefore, as a rule, given as approximations only. A chief reason for the discrepancies in published measurements everywhere apparent is found in the fact that there is no exactness or uniformity in the datum points chosen. The bases of ruins are covered with debris and the tops have disappeared; horizontal measurements, even where margins are preserved, are affected by the fact that the parts of the wall or surface selected by two observers are not the same. A tape line carried around the base of a building may give a very different result from an equally careful measurement made a few feet higher on the wall. It may be said, however, that for all ordinary purposes of description and analysis, exactness, though desirable, is not absolutely essential, as nothing of importance depends upon inches.

The cities and sites visited by our party are scattered over a wide territory extending from Cape Catoche on the east to the Valley of Mexico on the west, and to Chiapas and Oaxaca on the south. They represent, if the historian and archeologist have properly correlated the data of their respective departments, at least three principal and distinct stocks of people—the Mayas, in the states of Yucatan and Chiapas, the Nahuas, in the Valley of Mexico, and the Zapotecas, in the State of Oaxaca. Part I of this paper deals almost exclusively with the Yucatec division of the first of these groups. A very brief review of the history of the province, its people and art will be useful in connection with this sketch of the ancient remains, as it will, I hope, enable readers not familiar with the general subject to secure a connected view of the whole field.

YUCATAN RISES FROM THE SEA AND IS PEOPLED. We are told by the early Greek historians that a broad continent, known as Atlantis, once spread out over what is now the middle Atlantic Ocean; that this land was inhabited by a vigorous and cultured race of people who carried their arms eastward to the farthest limits of the Mediterranean, and that the Greek gods, righteously angered by these encroachments, retaliated by sending Atlantis to the bottom of the sea. It has been a favorite theory with many students that the American races may have been derived from this source, inheriting therefrom the germs of that strange culture now represented by so many ruined cities. Whatever may be the truth with respect to the disappearance of the one continent it is a curious fact that another land has risen from its watery bed. We are able to clearly show by the aid of geology that a large part of the great block of terra firma now known as Yucatan is a new-born realm. The massive beds of limestone of which the peninsula is formed contain and are largely

made up of remains of the marine forms of life now flourishing along the shores. Fossil shells obtained from the rocks in various parts of the country are all of living species and represent late Pliocene or early Pleistocene times, thus possibly bringing the date of the elevation of Yucatan down somewhat near that of the reputed sinking of Atlantis, some eleven or twelve thousand years ago, or not far from the period that witnessed the oscillations attending the close of the glacial period.

Whatsoever the period of these events, it is observed that the elevation of the level bed of the sea resulted in the formation of a strangely featured land, and that its peculiar topographic and geologic conditions have left their mark on the people and their art. The strata of soft, porous limestones were more or less broken up by the strong throes of upheaval and acted like a sieve for the surface waters which, charged with vegetable acids, dissolved for themselves subterranean channels leading hither and thither into the sea. As a consequence we rarely find a spring or stream of running water on the surface of the land in central or northern Yucatan. Though soil has gradually formed on the rocky plains, and dense forests have overspread all, there is everywhere present, especially in the dry season, the suggestion of a waterless and forbidding desert.

But a strange thing has happened to fit this land for habitation. As time passed by the roofs of the underground streams were perforated in places by the processes of disintegration and caving in, and yawning sinks were formed, in the bottoms of which could be seen pools of darkling water. In the midst of the forest the traveler comes suddenly upon these great cistern-like pits leading down into the bowels of the earth. Many are irregular in outline and section, taking the character of caverns, but others are so round and even-walled as to be taken for works of art. They are often a hundred or more feet in depth and as much as 200 or 300 feet in diameter, and in some cases the water cannot be reached save by ropes or ladders, while in others portions of the walls have fallen in, giving steep pathways down to the water's edge. From these unique reservoirs the water supply of the ancient nations was almost exclusively obtained.

Into this strange new land, some thousand or more years ago, pioneers of the red race gradually found their way, and, taking possession of the great wells, built themselves habitations. The brittle limestone strata of the surface were broken into millions of blocks by weathering and the strong roots of the forest trees, furnishing natural quarries, and the dwellers about the lonely wells built themselves houses of stone. They prospered and multiplied, and being isolated and largely free from intrusions from without went on from century to century building and developing the stone-shaping arts, until each and

every great well or group of wells was encircled with temples and palaces grand in proportions and rich in unique though barbarous sculptures. Mystic wise men—culture heroes—appeared to instruct the people in the arts and in religion. Comparative peace prevailed for a long period and the various communities seemed welded together in a strong and lasting union. But the rapid development of many centres of culture and power seem to have led to jealousies and feuds and we learn from native sources that only a few decades before the coming of Columbus disastrous wars ensued, depopulating many districts and leaving the cities in ruins. The strong culture impetus was thus weakened and the contentions of numerous chieftains pitted against one another dissipated the elements of national strength. When, however, the Spaniard appeared on the coast, substantial union was effected and a bold defense was made, and there is little doubt that but for the gun and horse Spain could not in centuries have secured a permanent lodgment in the country.

The conditions under which the middle and southern branches of the family developed were different in many respects from those of the north, and as a result there were marked distinctions in the people and their culture; but when the disasters that signalized the close of Maya power came, all were alike involved, all losing in the main their status as nations and nearly all submitting to the yoke of the Christian priesthood.

THE MAYA RACE. At the period of conquest the Maya tribes, occupying the peninsula of Yucatan and considerable portions of neighboring territory to the south and west, are said to have comprised in the neighborhood of 2,000,000 souls. Today they are distributed over nearly the same area, but are reduced in numbers, it is estimated, to less than 500,000, half at least of whom continue to speak the Maya tongue in its purity. At the north where there has been much infusion of Spanish blood the race has been largely modified and an interesting and very homogeneous half-blood people has sprung up; but in the interior many of the tribes are of nearly pure blood and retain a strong spirit of independence. It is said that some bands have never been fully conquered and they practically substantiate the claim by holding the temples of their fathers by force of arms, defying all comers, whether white or red.

Physically the Mayas are short, sturdy and dark, possessing generally the typical characteristics of the red race. Their mental equipment is conceded to be of a high order as compared with other native stocks. Their origin is largely a matter of conjecture. One account* connects them with the history of the god and culture-hero Itzamna,

* Brinton, D. G., *American Hero Myths*, P. 145.

and derives an important element or division of the race from the east, where they are said to have come across—or rather through—the ocean, thus forcibly recalling the story of Atlantis. The more probable derivation is, however, from the west, as tradition, myth, art and geographical conditions point in this direction more decidedly than in any other. It appears that there are few ties of language with the Aztecs or other Mexican peoples though there are numerous and striking analogies in arts and customs, and it is not improbable that in the course of their history the Mayas have come into close contact with the great tribes of the Plateau of Mexico. Indeed, all may have had a common origin to the north in Mexico, or even beyond the Rio Grande.

In the culture scale this people stood at the head of the American tribes. They were still, properly speaking, barbarians, but in several respects seemed to be on the very threshold of civilization. Their status may be compared to that of the Greeks and Egyptians immediately preceding the dawn of history, and we may assume that they were, as measured by Aryan rates of progress, perhaps not more than a few thousand years behind the foremost nations of the world in the great procession of races from savagery toward enlightenment. It is certain that they were already employing a rude system of historic records and were the only nation on the western continent that had made any considerable headway in the development of a phonetic system of writing. Their hieroglyphics occupy a place, not yet well defined, somewhere along the course of progress from pictograph to letter, and are consequently difficult of interpretation. There is no doubt, however, that an age of literature was actually though slowly dawning in America when the shock of conquest came.

It becomes clearly apparent to the student that ethnic conditions were more simple in Yucatan than in the great southern and western centres of culture. There was but one race; the land was not a thoroughfare for races, and the physical conditions were unique in their uniformity. We find here greater homogeneity in the monumental remains and, indeed, in all branches of art. There is, further, a strong probability that the permanent settlement of the country, or at least the introduction of higher phases of culture, took place at a comparatively recent date.

Today the chief reminder of the great past of the Mayas is the crumbling remains of their architecture, but remarkable advance had been made in several other arts not embodied in such durable materials. They made paper of maguey, and their books, several of which have been preserved and are now in the libraries of Europe, show advanced skill in pictographic and glyphic writing, and a fertility of imagination hardly paralleled among the known primitive races of the world.

Their calendar system was highly developed and appeared to have embodied in it so many elements of accurate chronology that European scholars were amazed. Alexander von Humboldt was so deeply impressed with its intricacy and perfection that he claimed it could not be wholly of native development, believing that certain elements had been borrowed from the far east; today, however, Brinton and others are of the opinion that it is pretty certainly the outgrowth of peculiarly American thought and practices. Its chief office appears to have been to serve the priesthood in carrying on their complex system of religious observances, sorcery and divination.

Their language is highly developed, though the speech is guttural, and its grammatical construction is said to resemble the English more closely than does that of any other American tongue. Their religion was more humane than that of the Aztecs, human sacrifice having been much less generally prevalent. The priesthood was no doubt intelligent and all-powerful. Their sociology and government showed modifications of the ordinary American systems.

They practiced agriculture with success, depending but little on the chase, and were inclined to peace rather than war. They seem to have had considerable commercial spirit and navigated the seas, trading with Cuba and other distant parts, possibly including even Florida. There are decided traces of Yucatec characters in the ceramic art of the Gulf coast of at least three of the states. In the various shaping arts they had few competitors in America, working with especial success in stone, wood and clay. Yucatan, formed of the younger sedimentary rocks, was without native metals. Copper, silver and gold were obtained from distant parts in small quantities and had but little place in the arts. The textile and ceramic arts were practiced with especial success, certain varieties of earthenware obtained from the southern Maya areas ranking among the highest work of its class in America.

MONUMENTAL REMAINS. Maya architecture, with its associated sculpture and painting, constitute the best remaining index of the achievements of the race. The 70,000 square miles of Maya territory are so dotted with the ruins of towns and cities that the traveler is seldom out of sight of some mound, pyramid or other massive structure. The preservation of these remains is wonderful, considering the four hundred years of decay and destruction through which they have passed. There is hardly a modern village or town on the peninsula of Yucatan that is not built in some part of materials derived from the ancient structures. Yet the work of demolition still goes on, and presently, unless the Mexican Government takes adequate measures to preserve them, the traces of a conquered race and its strange art will

exist only in books. Nature has vied with man in the work of leveling the noble monuments with the ground. The luxuriant vegetation which envelops the ruins sends a multitude of strong roots deep into the masonry at every vulnerable point; growing rapidly, they act like wedges, separating masses and aiding gravitation and the elements in their never-ceasing efforts at destruction.

FUNCTION OF BUILDINGS. The question as to the function of the many buildings now found in various stages of demolition in the Maya province has been raised again and again and still remains somewhat imperfectly answered. There is no doubt, however, that in the main they were devoted to the uses of religion. This is clear from numerous statements made by the conquerors, who were frequent witnesses of the strange rites practiced more or less publicly in similar buildings in all parts of the country. Further than this it is observed of many nations in various parts of the world that their most important buildings were devoted to the gods and the priesthood, and the American races, being intensely religious and profoundly moved by mystic ideas, would hardly afford an exception to the rule. Again many of the buildings are of such peculiar or specialized plan that we are warranted in assigning them definitely to religious uses; such are the so-called temples and shrines occurring in almost every group of ruins. They are unfitted for the ordinary purposes of dwelling, assembly or defense; they are restricted in space, are built on pyramids or terraces reached by steep stairways, and have a solidity of construction and an overloading of mythological embellishment not demanded by and hardly consistent with ordinary secular uses. There are other buildings, often of colossal size, and having many windowless rooms, which may have been occupied by religious societies or by functionaries whose duties pertained to the enclosed courts or to adjoining temples. Still they could as well have served ordinary domestic purposes, since life in these tropical regions must have been lived largely in the open air and the cavern-like chambers would serve as cool retreats in the summer and remain snug and dry in the prolonged wet season. Other structures still are wholly unique; one class, believed to have been gymnasiums or ball-courts, consists mainly of two parallel walls of great height and enormous thicknesses, and another are turret-like buildings to which no particular use can with reason be assigned. Possibly rites pertaining to the dead may have been extensively practiced in these buildings, but purely mortuary structures, if such exist, are not well identified. Tombs of simple construction are found in various relations with the ruined monuments, occurring not infrequently as vaults or small chambers in the sides of pyramids and terraces. Burials in what ap-

pear to be ordinary earthen mounds have been reported and some examinations have been made, but it must be admitted that as yet the methods of disposing of the dead by the Yucatecs are imperfectly understood.

The houses of the people were no doubt largely built of wood and thatch, or of these materials in combination with rubble, so that they have for the most part disappeared. They are doubtless well represented by the more primitive dwellings of the modern Mayas.

We find little evidence of the existence of a defensive motive among the builders, and on the whole the Mayas must, during the period of greatest prosperity, have been a peaceable people. There is little or no indication of the selection of particularly defensible sites and few walls have been found that resemble fortifications. The grouping of buildings in general plan has no suggestion of a defensive arrangement, and the occasional assemblage of four strong structures about a court, though presenting somewhat the appearance of a fortress, has apparently no significance in this connection; the buildings are in many cases placed so far apart at the corners as to give free access to all comers, and the doorways to apartments are occasionally in the outer walls. Then again the doorways bear no evidence of having had doors of a nature to aid in defense. There are a few examples of entrances whose peculiar construction cannot be explained save on the theory that they were intended to make access difficult. This may not indicate a defensive purpose but rather the intention to remove the chambers as far as possible from public intrusion. The great thickness of walls and the extraordinary massiveness of construction had no reference to defense, but resulted from the crude efforts of aspiring builders to secure the strength and permanence that greater experience would have secured by less costly means.

THE ARCHITECT AND HIS PLAN. Some of the buildings are composite and show successive accretions or periods of growth, and this is true to a large extent of the greater buildings of most nations, but there are others that stand as perfect units of design, in which the conception must have been complete in every detail when the construction began, a master mind controlling the cutting and the placing of every stone. There may have been working drawings—and the people were certainly equal to the task of making them—but if there were none, the carrying out of the work without them must be regarded as even more remarkable. The construction of such buildings as the Palace at Uxmal and the Castillo at Chichen indicate a mastery in architectural design well calculated to astonish the student of the half-crystallized culture of the American races in general.

There can be little doubt that when the work of building began in such cases, the ground plan, elevation and constructive design were fully worked out and the spacings of doorways, moldings and panels and all details of sculptured decoration were fully decided upon; and I should say that even details of stone cutting, the number, width and angle of courses of masonry, were predetermined, as otherwise, with the complexity of form and the infinity of geometric detail characterizing the façades, utter confusion must have resulted.

INSTRUMENTS OF PRECISION. As to the implements and devices used for securing precision of dimension, line, surface and angle, opinions differ. There was, no doubt, a vast deal of simple eye work—and what people have native powers in this direction superior to the Americans?—but whether a definite unit of measurement had been devised, or whether the square and plummet as known to civilized builders were employed, it is certain that competent devices were in use, since the carrying up of the varied walls of structures hundreds of feet in length and width and many feet in height, with constantly varying relations of parts and play of angles and slopes, without accurate appliances, without something better than the “mere rule of thumb,” would have required superhuman powers on the part of the builders.

ORIENTATION AND ASSEMBLAGE. Notwithstanding the suggestion of mastery in the art of designing and building, there is much lack of unity in the general plan and grouping of the structures. Though there is usually a suggestion of recognition of the points of the compass in placing the buildings, very few are accurately oriented, and there is such diversity of variation that we must conclude there was no particular demand for uniformity, a conclusion rather at variance with the accepted notion which gives regard for the points of the compass a high place in native concepts. In other parts of Mexico, as in the Valley of Mexico and Oaxaca, orientation was attended to with much greater care.

As to the existence of anything like a system of streets or roadways little can be learned from the ruins themselves. Usually the association of separate buildings appears to be merely that of convenient proximity. Perhaps the most usual form of assemblage is that of apartments or buildings on or about a terrace or pyramid, the cluster suggesting the cell groupings of some insects. The only approach to system in the grouping of the structures of the Yucatec cities is seen in the assemblage of four buildings about a court. This arrangement prevails extensively in the Zapotecan and Nahuatl cities of Mexico proper. The members of the quadrangles are, I believe, sometimes joined at the inner corners or perhaps connected completely all around,

but more frequently they are separated, giving free access to the court. In a few cases there are compound clusters of buildings embodying two or more courts, as in the Palace at Palenque.

BUILDING MATERIALS. The nature of the materials at the disposal of a people inclined to building exerts a profound influence upon the results achieved. Stone of somewhat decidedly favorable qualities would seem almost essential to greatness in the art of architecture. The Mayas were especially favored in this respect. The peninsula of Yucatan is composed of massive beds of limestone, homogeneous in texture and easily cut, even with primitive tools. Nature had not only supplied the stone, but it had in some measure prepared it for building. Although the land is approximately a plain, it is still in a small way broken up by low ridges and steps, and by sinkage into underground channels. The forests, growing densely everywhere, have broken up the surface beds, giving great quantities of loose stones immediately available to the builder and directing the way to the opening and working of quarries. The presence of unlimited supplies of limestone together with timber made the burning of lime an easy task and this product was extensively employed. The Yucatec stone mason had, therefore, every necessary building material at hand, although he still lacked, in a great measure, materials suited to the manufacture of quarrying and cutting tools. Cherty seams or masses of indurated limestone, occurring in many parts, served for the ruder tools, and picks and chisels of special hardness were probably brought in from a distance. Copper chisels are occasionally found as far east even as Cozumel, but if used at all in the dressing of stone they must have taken an unimportant place in the work on account of the rarity of the material. I had no time to seek the quarries from which stone was obtained in Yucatan, but had the good fortune to come upon excellent examples in Oaxaca. Careful descriptions of these will be given in Part II of this paper.

Mortar, made of lime and sand, and cement-like mixtures composed of mortar tempered with gravel, pounded stone, etc., were extensively used, and their durability is remarkable. Numerous floors and roofs are still preserved, and many fine examples of stucco modeling have withstood the destructive effects of the weather for four hundred years or more.

The builders made very considerable use of wood, which, considering the inferior grade of tools available, was cut, hewn and carved with much skill. Wood must have been extensively used in connection with the great stone buildings, as in doorways, in closing spaces between structures now disconnected and in various enclosures and barriers. There is no doubt that pliable vegetal growths,

such as poles, bark, vines, twigs, etc., used in textile or semi-textile combinations, were very fully employed in ordinary domestic structures as well as in less pretentious buildings of other classes pretty much as they are to-day.

TRANSPORTATION. The gathering of stones and the cutting out of masses from the living rock were followed by transportation, a most tedious and laborious task for a people without beasts of burden and probably without many of the effective transporting devices known to more advanced peoples. The work of carrying the earth, mortar and stones used in hearting the pyramid of the Castillo at Chichen or the triple-terraced pyramid of the Palace at Uxmal was of itself a great undertaking, but the transportation of the countless stones for the facing of both pyramid and superstructure and the lifting of the larger masses employed in columns, jambs, pillars and the like to heights reaching in cases nearly one hundred feet, required strong hearts and hands and a controlling power of exceptional vigor and permanence. The Yucatec Mayas did not, however, undertake to employ stones of enormous size, as did the ancient builders of Mexico and Peru. No block or mass was observed estimated to weigh more than six or eight tons.

STONE CUTTING AND SCULPTURE. In constructing the greater buildings of Yucatan, vast quantities of stone were required, and the labor of dressing and carving it must have been exceedingly great. This would be true if nothing but the plain squared and faced stones were considered, but when we behold the broad sculptured façades of such buildings as the Governor's Palace at Uxmal or the Casas at Kabah, our minds are filled with wonder. Words fail to give a clear notion of the work, for what definite conception is conveyed when it is stated that in a single continuous façade upward of twenty thousand stones were used, not only hewn of varied special shapes, but each sculptured to represent some individual part of a face, figure or geometric design, and all fitted together with such skill as to give the effect of an unbroken whole? Maya statuary, if such their most ambitious sculpturings may be called, is, of course, conventional, and from our point of view, extremely crude, but these works were almost exclusively intended to be employed in architectural embellishment and were all-sufficient for the purpose. Such are the figures and groups of figures sculptured in high relief or in the round and set in niches in the walls, or fixed by means of tenons in various parts of the field of decoration. There seem to be, in the north, no figures corresponding to the remarkable monolithic carvings of the southern Mayas in Guatemala and Honduras. Such works as the recumbent human figures or Chac-Mools, the tigers and Atlantean figures of

Chichen are not of a high order of art and were probably mostly, if not exclusively, mere adjuncts of building or furnishing rather than independent or individual works of sculpture.

MASONRY, STUCCO WORK AND PAINTING. The masonry comprises, in general, hearting and facing. The former consists of earth, mortar and stones variously combined and usually forming strong, well-compacted bodies. The latter consists of stone cut or uncut and laid up, with few exceptions, in excellent mortar. Where the stones were accurately cut, little mortar appears in the face of the wall, but it was freely used in the hearting, and when the facing stones were deep they were dressed somewhat smaller behind, and set back in the mortar as a tooth in its socket. In the facing of many walls, however, the stones were very shallow—often mere tile-like slabs—and had but slight hold upon the body of the hearting.

In those centres of building operations where the limestone was readily worked and of fine, even texture, the facing is well cut, and the wall surfaces are in general so even and true as to stand the test of the square and plumb line; but in localities where the stone is uneven in texture and quite hard, or in provincial sections where building was not carried to a high degree of perfection, the facing is rarely well dressed, save about the doorways, arches, corners and especially exposed parts. Rough surfaces were very generally evened up with plaster.

A remarkable feature of these structures is the great thickness of the walls, and especially the extraordinary massiveness of the masonry above the spring of the arches. This is clearly shown in several of the sections inserted in the following pages. Where, for example, the outer wall is three feet thick and the arch within is ten feet wide, the mass of masonry thickens upward from three feet at the base of the arch to eight feet at the ceiling level, and in an inner wall, widening both ways, to thirteen feet, so that two-thirds or more of the space included in the upper half of the structure is solid masonry. The roof is often very thick, thus greatly increasing the bulk, and it seems a marvel that collapse from mere weight has not been more frequent than seems to have been the case. To all this bulk was added, in many instances, massive false fronts or colossal roof-combs laden with ornament. So strongly knit is the masonry, however, that but for the decay of wooden lintels, most of the great façades now in ruins would have been very fully preserved. I have computed that a single-chamber structure, with walls of usual thickness and with average arch space and roof mass, would have two-thirds of its bulk solid masonry, which looks like a lavish waste of space, material and labor. If we take the measurements of the Governor's Palace at

Uxmal, given by Bancroft, we find by a rough computation that the structure occupies some 325,000 cubic feet of space, upwards of 200,000 of which is solid masonry, while only about 110,000 feet is chamber space. If the sub-structure be taken into account, the mass of masonry is to the chamber space approximately as 40 to 1.

Notwithstanding the success of these Maya masons in erecting buildings capable of standing for hundreds of years, they were yet ignorant of some of the most essential principles of stone construction, and are thus to be regarded as hardly more than novices in the art. They made use of various minor expedients, as any clever nation of builders would, but depended largely on mortar and inertia to hold their buildings together.

One of the most elemental essentials of good work is the systematic breaking of joints in laying one course of stones over another. This idea had hardly been grasped, as it not infrequently happens that a seam or succession of joints is connected almost directly from base to summit of a wall, and at corners, within and without, and about doorways the stones are not bonded at all and are free to fall out as soon as the mortar gives way. The only possible explanation of this condition of the work that occurs to me is that the habit of treating the stones of a wall as so many elements of a mosaic pattern has tended to retard progress in the direction of what is sometimes called scientific construction. It will readily be seen that in carving and laying the stones of a geometric design, as a line of fret-work or of snouted masks, it would be extremely inconvenient to adapt the shapes to any system of jointage, and indeed such a thing would be out of the question.

Another considerable element of weakness in many of these structures was the employment of veneered facing over large surfaces without sufficient headers or long transverse bonding stones. The tendency to break away, even with very thin stones, is in a measure counteracted by giving the back a bevel almost from the face, thus allowing the mortar to come well forward in strong tongues nearly to the surface. In some cases the facing has fallen in a body from considerable areas, exposing the hearting, which presents a remarkably even surface as if built first as a rough wall to be faced up afterward at the convenience of quarrymen and stone-cutters.

The laying of plaster or concrete floors and roofs was an important feature of the mason's work, and the areas covered were often very large. Stucco, a term applied to plaster when used in modeling, was extensively employed in decoration and required special skill in its manipulation. This work was probably executed by the sculptor or by professional modelers. It was adapted to all

classes of work and especially to graphic or non-geometric embellishment, and found its greatest field perhaps in the elaboration of colossal faces and figures such as may be seen at Izamal, Nocuchich and Palenque. At Palenque, important wall spaces, roof slopes and expansive roof combs are loaded with ambitious mythological subjects. Where the relief was bold, stones of suitable length and size were set into the masonry to support the plaster. Thin slabs of limestone were sawed into strips and cemented together very skillfully to form the skeleton of the figures. Upon this foundation the plaster was modeled, finished, polished and painted. In some cases glyphs and parts of figures and ornaments were first separately modeled and then set into place in the backing of fresh mortar. It is observed that in some cities stucco embellishment prevailed, while in others sculpture held almost undisputed sway. It is not known whether this difference is to be attributed to distinctions in the people, to difference of period or to the influences of peculiar local environment.

It was the practice to finish plain walls in plaster, often rather roughly applied, and nearly all surfaces, exterior and interior, where effect was of consequence, were finished in color. Very often plain surfaces in corridors and important apartments were embellished with graphic subjects, ornamental designs, devices and glyphs in brilliant colors. Sculptures in the round and in all degrees of relief were also colored with great care and elaboration. The range of colors is wide, including black, white and various shades of green, blue, red and yellow. Their composition has not been made a matter of study, but they probably include both mineral and vegetal substances.

As to the methods of manipulating stone, mortar and color, little is definitely known, save through a study of the actual remains. Unlike the Egyptians, who pictured almost everything relating to their own arts and avocations, the Mayas give us but few hints of these things, both graphic and plastic art dealing almost exclusively with sacerdotal subjects which furnish, incidentally only, hints of practical things. A notable exception is found in one of the Bodleian codexes, where various domestic episodes and illustrations of the practice of ordinary arts are given. Stone, when required in large bodies, was cut out of the mass, probably with rude stone picks, and flaked and pecked into shape at great expense of labor. Very generally the dressed surfaces show the chisel and pick or hammer marks, as indicated in the specimen illustrated in Pl. II. It will strike the observer as remarkable that the tool marks in this case retain the whiteness of the original bruise so distinctly as to be photographed,

but this effect is deceptive ; the roughened surface of the bruise merely retains the white particles of the mortar or paint which have disappeared from the smoother fractured surfaces. Attention may be called to the markings near the upper margin of the stone; the blows employed in flaking off the upper surface and straightening the corner have been made with a sharp straight-edged tool, such apparently as are known only in metal. A little below the edge is a second line of these marks, indicating that the workman had contemplated and then abandoned a further reduction of the width of the stone.

I am not able to say with certainty to what extent the dressed surfaces of the stone in the walls of the buildings were ground or polished, but it seems natural that abrading processes should have been generally employed. Hammer stones, sledge-heads, picks and chisels of hard stone are found, but not in the great numbers that might be expected. They are not superior in make to like tools employed by the average American savage, and none of them seem capable of having made the marks illustrated in the figure. We are thus led again and again to wonder whether it is not possible that metal tools were used and that traces of their existence, save in the sculptures produced, are wholly obliterated by time.

The lime-burner and the color-man were most important auxiliaries of the Maya builder. Mortar was used in enormous quantities and manipulated with great skill, and the same may be said of color; and the trowels and brushes employed were no doubt such as primitive people usually devise. It should be observed that it was a common practice all over the Mayan, Oaxacan and Nahuatl territories to finish architectural ornaments, statuary and glyphs, where the stone was not of the finest quality and susceptible of high polish, in thick enamel-like coatings of varied colors which adhered with wonderful tenacity to the stone surface and were polished down with the utmost care, not reducing the relief or distinctness of even the shallowest sculpturings, but being made by skillful manipulation to emphasize and refine these features.

During the great days of temple building the scenes about and within one of these Maya cities must have been exceedingly animated and novel. The hosts of people planning and directing the work; quarrying, cutting, transporting and lifting the stone; burning lime, carrying water, mixing mortar, hewing wood, preparing paints, and engaged in the work of building and decorating, must have furnished scenes in striking contrast with the desolation of the dismantled and forest buried cities of today.

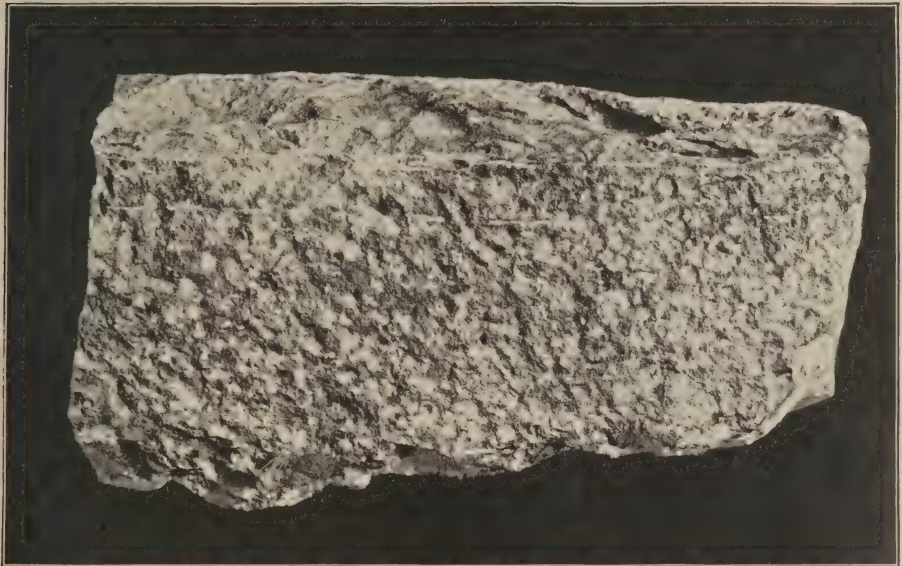
SUBSTRUCTURES. The ancient cities of Yucatan were built on plains or on comparatively level ground and were without the ad-

PL. II. FRAGMENT OF HEWN STONE FROM CHICHEN-ITZA.

Showing marks of the implements with which it was shaped. The upper surface was flaked off by strokes from an edged tool, as indicated by the white lines near the margin, and the face was rough dressed by pecking with a pointed tool.

FIELD COLUMBIAN MUSEUM.

ANTHROPOLOGY, PL. II.



FRAGMENT OF HEWN STONE FROM CHICHEN-ITZA.

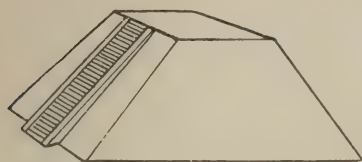
vantage of bold natural features, but art largely supplied this want, and no nation of builders, save possibly the Mound-builders of the Mississippi Valley has ever equaled this people in the number, variety and size of its terraces and pyramids; however, there appear to be no pyramids that are mere pyramids, no terraces that are mere terraces; all or nearly all were constructed to support buildings, altars or idols, and their diversity of size, contour and position give striking and picturesque results. Usually the substructures are square or rectangular in plan. The largest reported in Yucatan is upward of 500 feet in length and width, and the height of the loftiest reaches nearly 100 feet. The sides slope at various angles and some are practically vertical in whole or in part; many rise in steps, the succeeding terraces or platforms being of equal or unequal height and of varying horizontal extent. As a rule they are or were faced with stone which was dressed smooth or plastered. In the finer structures the terrace faces were panelled in hewn stone or embellished with moldings or with sculptured or stucco reliefs. The corners were often rounded and formed of large and specially sculptured stones. They were ascended by substantial, generally steep and wide stairways on one or more of the sides. The interior mass was constructed of earth and stones or mortar and stones usually forming a solid or well compacted body. In cases, however, this pile was not depended upon as a sufficient support for the superstructure, and foundation walls were carried up from considerable depth or from the ground level. The upper surface was generally floored with cement, though paving with slabs is occasionally seen. No doubt these piles were in cases the result of a long period of growth, and it probably sometimes happened that when a loftier structure was desired ground floor apartments were filled in solid with rubble or masonry, giving firm foundations for a second story or superstructure. In some cases the exterior of vertical-walled substructures was enforced by abutting masonry entirely encasing the original nucleus and giving the effect of an ordinary sloped terrace or pyramid.

In Fig. 1 a few examples of terraces and pyramids are presented in outline. The variety of contour is very great and it may be said that no two specimens are alike. The most unique form is that of the Temple of the Magician at Uxmal, *h*, which is oblong in plan and rounded at the ends; the loftiest is that of El Castillo at Chichen, which is of the stepped type seen in *f*; while the grandest and most diversified in contour is that of the Governor's House at Uxmal, shown approximately in *g*. In *a*, *b*, *c*, *d* and *e* we have what may be regarded as the most common forms. The substructure of the Temple of the Tigers at Chichen, *i*, is peculiar only

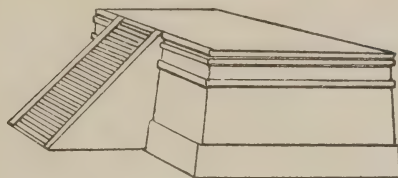
in being associated with the great wall of the Tennis Court or Gymnasium.

STAIRWAYS. The stairways of the Maya pyramids (see Fig. 1) share in a large measure the boldness and magnitude of the constructions with which they are associated and of which they form an essential part. A single stairway would have afforded all necessary access to the lofty summits, but it is not unusual to find two flights, and three or even four flights are known leading to the same temple, and each built on an equally grand scale and finished with like elaboration. All are exterior and centrally placed, leading directly up the face of the pyramid. Usually they are wide and bordered with some kind of solid balustrade. The favorite design for the rail is a colossal serpent, the head with wide open mouth and protruding tongue extended upon the ground, the body, appropriately carved, extending to the summit. In Yucatan the steps are neither high nor wide, averaging perhaps a foot in rise and a little less in tread. The pitch is thus 45 degrees or more. The stones used are generally rather small and not very smoothly dressed or well fitted, and it is probable that all important flights were finished in cement and color. The stairway usually conforms to the slope of the pyramid or shows only a little relief therefrom, but occasionally the angle is reduced, throwing the base out from the base of the pyramid, suggesting the graded way of the Mound-builders. Where associated with a vertical or very steep ascent or a series of rises, it is built out solid or carried over arches, as in the Palace at Chichen. Interior stairways are not found in pyramids and are rare and unimportant in the superstructures; the winding stair in the round tower at Chichen and the several narrow flights in Palenque being perhaps the best known examples. The most interesting stairways met with on the voyage are in the courts of the Palace at Palenque. Here large stones were used, on the faces of which are glyphic sculptures. The evolution of the stairway in its various forms was probably simple and natural and seems to present no problems—no obscure passages—worthy of particular discussion.

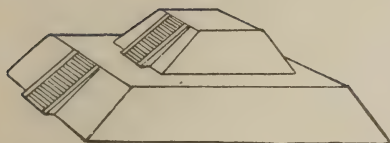
SUPERSTRUCTURES. I cannot undertake in this place to give more than a mere outline of the leading features and characteristics of the many buildings visited. A few only of the larger structures are built on the ground level of the site, though many are but slightly raised. In some cases the terraces and pyramids have developed in sections by the addition of parts needed to accommodate new buildings, and again, as already mentioned, the supporting pile has been built and completed at once to receive the superstructure upon its



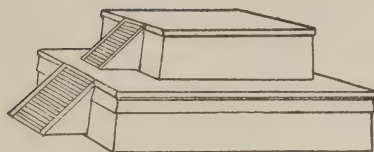
a



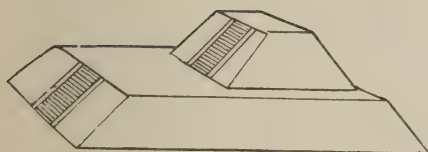
b



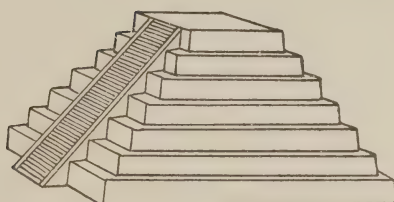
c



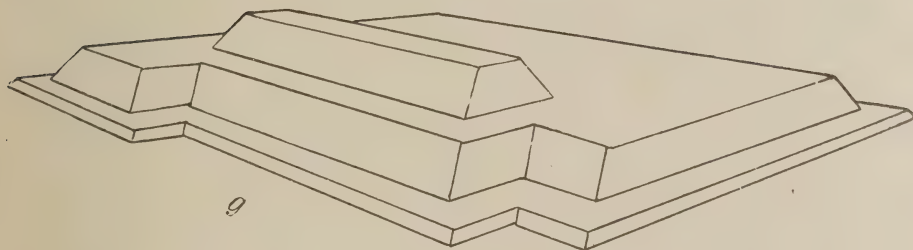
d



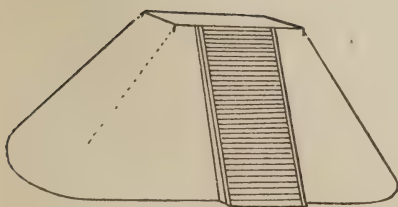
e



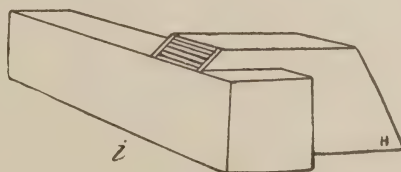
f



g



h



i

H

FIG. 1. EXAMPLES OF TERRACES AND PYRAMIDS, SUPERSTRUCTURES OMITTED.

summit. The plan of the building in the one instance is often composite and irregular and in the other is simple and regular. A number of buildings may occupy a single large foundation mass, and buildings or chambers may occur independently of each other on different levels of the same substructure. In a few cases only, as at Tuloom and Palenque, do we find a second story built above a lower story which has not first been filled up. Where several buildings of different levels are associated, the lower tier stands against the base of the pyramid, the second, back of this, occupies the first terrace, and the third, back of this again, is on the second level.

The ground plan is usually rectangular, two or three examples only of round houses having been reported. Large buildings of independent position are mostly rather long and narrow, the width having been limited by the difficulty of widening the arch where one or two tiers of rooms are used, and of securing light in the inner chambers of multiple tiers, since the upper wall and roof are never perforated. In detail the plan of large buildings, even the most complex, shows little more than a mere multiplication of the simple rectangular cell unit. Exceptions are found in the Round Tower of Chichen and in the corridor-like galleries of Palenque, and, no doubt, also in several multi-columned structures now too much ruined to be fully analyzed.

The buildings usually classed as temples are not large and are generally squarish in plan. They have from one to four rooms. When the rooms are multiple they are so arranged as to indicate pretty clearly a specialization of use. The two essential features in such cases are an outer chamber or vestibule and an inner chamber or sanctuary. The vestibule is entered by a plain, single doorway in inferior structures, and by a wide doorway divided by columns or piers in those of the better class. Usually it extends entirely across the front of the building. The fully developed vestibule is a modified outer chamber, and is characterized by multiple exterior doorways separated by piers or by columns, giving the effect of a portico closed at the ends. The sanctuary is mostly entered by a central doorway, though lateral entrances are sometimes provided. Additional rooms are arranged about the sanctuary at the right or left or extend behind it, as in the case of El Castillo at Chichen. Most of the Palenque temples have an outer apartment of the vestibule type, entered between piers; and a back apartment enclosing a small roofed sanctuary, entered by a single door. Small rooms are placed at the sides. When there is a single chamber only, which is not uncommon, it exhibits frequently the characters of the vestibule. Altars are rarely found, the only example met with being in a small temple on the

Island of Mugeris. In Fig. 2 a series of temple plans is given, illustrating the remarks just made. I take it that, if these varied structures are properly called temples, any apartment or any suite of apartments in any building may have served the purposes of a temple,

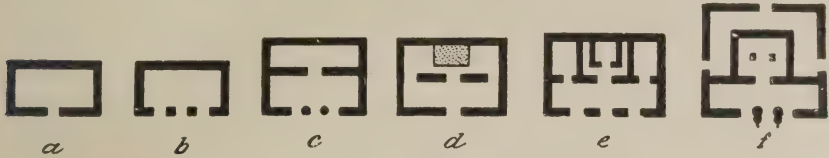


FIG. 2. SPECIALIZATION OF THE GROUND PLAN OF MAYA TEMPLES.

- a* Single-chamber building with plain door.
- b* Single-chamber temple with wide doorway and two square columns.
- c* Two-chamber temple, the vestibule with wide doorway and round columns, and the sanctuary with single plain doorway.
- d* Two-chamber temple, the vestibule with simple doorway, and the sanctuary with three doorways and a low altar.
- e* Four-chamber temple, Palenque type, the vestibule with three entrances and two squarish piers, the sanctuary with tablet chamber, and two small lateral chambers.
- f* Three-chamber temple, Chichen-Itza type, the vestibule entered by wide portal with two serpent columns, the sanctuary enlarged by introducing two square columns to support the triple vault, and a long gallery with three doorways extending behind.

though the term may not with propriety be applied to any structure not showing peculiarity of placement or style, in which there is not some variation from the mere grouping of simple chamber units.

Ordinary doorways are single and give entrance to a single room or, at most, to a suite rarely having more than two or three rooms. Back rooms are entered by doorways closely resembling the outer ones, getting all their light through them. The various forms of doorways are described farther on.

Apartments of all classes and all vaulted spaces are, with a few exceptions, limited in width by the capacity of the native arch to twelve feet or less. The length has no necessary limit, reaching in cases sixty feet or more. Such long rooms may be entered by a number of doorways and thus approximate the corridor type. It is reasonable to suppose that some of the buildings, now represented by piles of debris from which protrude multiple rows of columns, as at Chichen and Aké, were much more expansive in their apartment spaces which were rendered coalescent by the use of columns instead of partition walls. A notable feature of the plan in quadrangular groups of buildings is the gateway or wide, arched passage which opens through one of the outer buildings into the court.

The greater Maya buildings, though at times appearing complex in plan, are really exceedingly simple. The unit is the single cell or chamber seen standing alone in *a*, Fig. 3. The building shown in *b* consists of several units combined in one; variety is given to the plan in unsymmetrical structures by adding other units in less uniform ways and

of varying size. The building shown in *d* differs from the preceding in having a sloped instead of a vertical entablature, the interior arrangements being much the same as in *b*. A sketch, intended as a restoration of the Caracol or Round Tower of Chichen, is presented in *c*.^{*} This edifice contains two circular, concentric chambers identical in constructive principle with the rectangular forms. In *e* we have the Palenque type of temple, and *f* is the square tower of the Palace at Palenque, the plan and construction of which are peculiar in several respects.

WALL SURFACES, CEILINGS, ROOFS, ETC. Under the head of masonry I have given some details of the composition and construction of the walls and buildings; these need not be repeated here. The walls are massive, ranging in all important buildings from three to five feet in thickness, and in special cases reaching eight or nine feet. Though the so-called Gymnasium ramparts at Uxmal and Chichen are much thicker than this, they are not to be classed with the walls of buildings. The exterior wall faces are seldom pierced or interrupted save by doorways, vaulted portals and small openings, the latter probably intended for ventilation, and in Yucatan, with some exceptions, they rise vertically or nearly so to the full height of the buildings. In the Palenque or Usumacinta province, the upper wall or entablature zone usually inclines inward, conforming more or less closely with the slope of the arch within. On the inside the walls rise vertically to the spring or base of the arch, a height varying from a few inches to ten or twelve feet. The inclined surfaces of the arch, in each apartment or covered space, slope inward from the sides, and sometimes also from the ends, at an angle of from fifteen to forty degrees from the vertical, and either meet at the top in a sharp angle, as seen in a few cases at Chichen and elsewhere, or approach to within a foot or two the narrow way, when they are connected by horizontal slabs and firmly held together by the superincumbent roof-masonry. Flat ceilings supported by wooden beams occur in a very few cases, as at El Meco and Tuloom on the east shore, but many of the buildings now roofless were probably so constructed. Stone beams were used for short spans, as in miniature apartments, narrow openings and passageways.

The treatment of the interior wall surface is not greatly varied, yet within a limited range presents some interesting features. It is remarked that the apartments are little broken up by fixed features such as steps, stairways, niches, altars, tables, mouldings and the like, and there are but slight signs of the former presence of movable furnishings such as might be expected in fully occupied

^{*}It seems reasonably certain that the walls of both stories of this building were vertical as indicated, but the number and position of the openings of the upper turret, and the character of the platforms, or roofs, remains problematical.

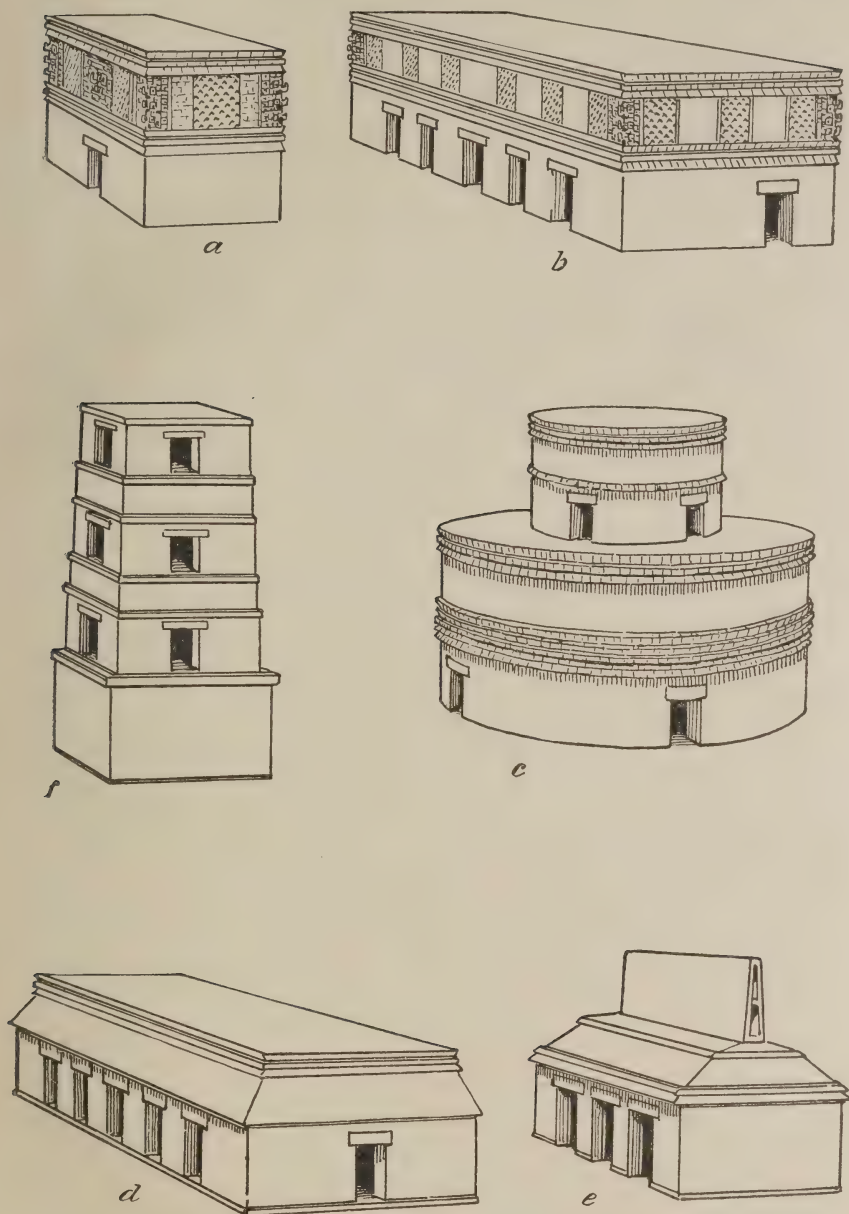


FIG. 3. EXAMPLES OF MAYA BUILDINGS.

- a.* Single-chamber building—a unit of construction.
- b.* Multiple chambered building—an assemblage of 12 or 14 units.
- c.* Restoration of circular building, Chichen-Itza.
- d.* Building with sloping entablature, Chichen Itza.
- e.* Temple with sloping entablature and roof-comb, Palenque.
- f.* Square tower of four stories, Palenque—roof restored.

domiciliary chambers. High up in the arches are occasional cross-beams or poles set in the masonry as if to support the sloping walls while the mason was at work, and probably used incidentally for suspending hangings or property. At the sides of the doors are numerous sunken cord-holders—a kind of dumb-sheave, as sailors would say—carved or built into the masonry, by means of which textile hangings were probably suspended or held in place. Illustrations of these devices are given in Fig. 4. In *a* we have a good example of the

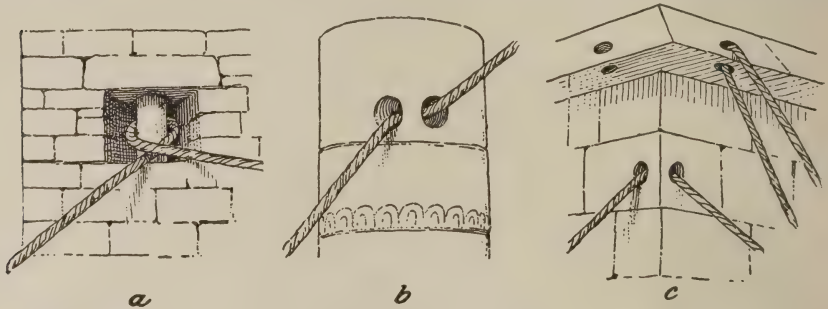


FIG. 4. CORD HOLDERS OR DUMB SHEAVES.

Cords are introduced to show probable manner of use.

- a* Form of dumb-sheave built into the masonry wall.
- b* Drilled cord-holder in back of column.
- c* Cord-holders as used in moldings and corners of jambs and walls.

dumb-sheave holder typically developed at Palenque. It is built in the plain masonry wall. The depression is seven inches high and ten inches deep and the small stone cylinder is four inches in diameter and sets back about four inches from the wall face. This form is usually found on the inside of doorways, a foot or two back from the jamb, and distributed in rows of three or four from lintel level to floor. Example *b* is of the countersunk type and occurs in the back of a serpent column at Chichen-Itza. The same type is utilized in corners, eaves, moldings and the like as shown in *c*. These sketches represent the better class of holders. Many examples are so poorly made that they would not withstand a strong pull by an able-bodied man, and some are modeled in plaster.

In interior as in exterior walls, the masonry exhibits all grades of finish from the rough, unhewn, irregularly laid stone facing to the perfectly dressed and coursed surface; the rougher surfaces were generally plastered and very many were finished in color. Small, dark, unimportant chambers, passageways, etc., were given but little attention. In cases the surface is carved elaborately, as in the ground floor apartment in the Temple of the Tigers at Chichen; and in other cases the walls were covered with paintings of mythic or historic subjects or with conventional decorations in color, as in the upper building in the same ruin. Exceptional features of interior construction

and finish are observed in Palenque, where the walls of sanctuaries are covered with inscribed limestone tablets and stucco reliefs. In other cases, as in the Palace at Palenque, the walls are embellished with elaborate stucco devices and figure subjects in relief, all richly colored.

Exterior wall surfaces, especially the façades of buildings, embody many striking characters. They exhibit all grades of finish, from the mortarless wall of rough irregularly laid stones, to the unbroken field of sculptured or modeled decorations. As a rule they are plainer below and increase in richness of treatment toward the top, terminating, in many of the great structures, in flying fronts devoted exclusively to decorative effect. Of the same order as the latter is the central roof-comb found in many buildings, and well illustrated by the House of the Pigeons at Uxmal and the Temple of the Cross at Palenque. The treatment of façades indicates a pronounced love of display on the part of the builders, and in many cases at least nine-tenths of the labor expended on a building is represented in show alone.

Among the most persistent features of the mural surfaces in Yucatan are the two lines of moldings, one of which extends around the building nearly midway in its height, and the other at the top associated with the coping stones. The mural space is thus divided into two zones of nearly equal width, the upper representing the entablature of classic styles. In the Usumacinta province, where the entablature zone slopes backward, the inferior and superior moldings are less uniform in profile, and less pronounced in character. The lower zone is usually nearly plain and contains the doorways; the upper is finished with symbolic and decorative sculptures. The high arched gateways or portals which penetrate some of the buildings, usually giving entrance to the court, extend upward into the upper decorated zone. The flying façade sometimes added above to give extra height repeats, in a measure, or continues the decorative features of the entablature zone below. The same may be said of the roof-comb, but this feature, in one case at least—the House of the Pigeons at Uxmal—repeats both the lower and upper mural zones.

The illustration given in Fig. 5 will serve to indicate sufficiently the construction and relations of the various features of an ordinary Maya building. The upper part of the sub-structure or pyramid is included and shows the stairway at the left, approaching the front doorway, and a plain slope at the right. Details of the masonry of this mass are somewhat hypothetical, as I have not been able to determine whether or not it is the rule that a special foundation wall with vertical outer face was built from the ground up, but it is certain that this was often the case, and that the stairway and abutting masonry were afterward added, as here shown, transforming the vertical-faced sub-structure into a sloping one. The floor is cemented as a rule,

but occasionally is flagged, and the inner floor is in cases a step higher than the esplanade without. The superstructure here utilized, has two chambers, or two tiers of chambers, vaulted with the ordinary arch, and the walls are vertical without as is usual in Yucatan. The nature of the facing and hearting is shown in section in the back wall at the right, and the illy jointed and bonded masonry is correctly represented. The use of larger stones in the jambs of the doorways is indicated at the left. At *a* is the plain lower wall with doorway at *b*, and above is a sectional view of the wooden lintels, *c*. The front and back chambers are connected by a second doorway, *d*, identical with the outer one. The sloping sides of the corbellate or offset arch, dressed with the bevel, are seen at *e* and the capstone is at *f*. Special features seen within the rooms are the small, square, wall perforation at the right, the poles or braces within the arch above, and two forms of cord fasteners—not large enough to be clearly made out—at the side of the inner door. One pair of these is made by drilling holes from adjoining faces of the stone until they meet, and the other by building a deep depression in the surface of the wall into which is fixed a vertical piece of round stone. The medial moldings, separating the two mural zones, typically developed, are shown at *g*. The upper zone with its sculpture-mosaic surface is seen at *h*, and the upper or frieze molding and coping course appears at the top, *i*. Continuous with the façade plane is the false or flying front, repeating the decorations of the façade proper more or less faithfully, and solid or perforated as the builder pleased or the nature of the ornament suggested. In some cases this feature is repeated in the same form over the medial wall of the building, but more frequently we have a more ambitious roof-comb, as indicated at *k*, and typically illustrated in the House of the Pigeons, Uxmal. It appears that the two forms are not likely to occur on the same structure. Details are given in other connections. In the drawing the combs are disconnected from the building so that the ordinary roof may be seen in its level simplicity.

DOORWAYS AND OTHER WALL OPENINGS. The wall perforations of Maya buildings may be arranged under six heads. They consist of (1) simple rectangular doorways with jambs, lintels and sometimes sills, (2) multiple or compound doorways in which the wide void is divided by one, two, three or more columns or pillars, (3) arched doorways which are of rare occurrence, (4) certain window-like openings or air holes of small size and varied shape, (5) the diversified openings in flying façades and roof-crests, some representing the interspaces of geometric ornaments, and others resembling doorways in their construction, but serving no function save that of embellish-

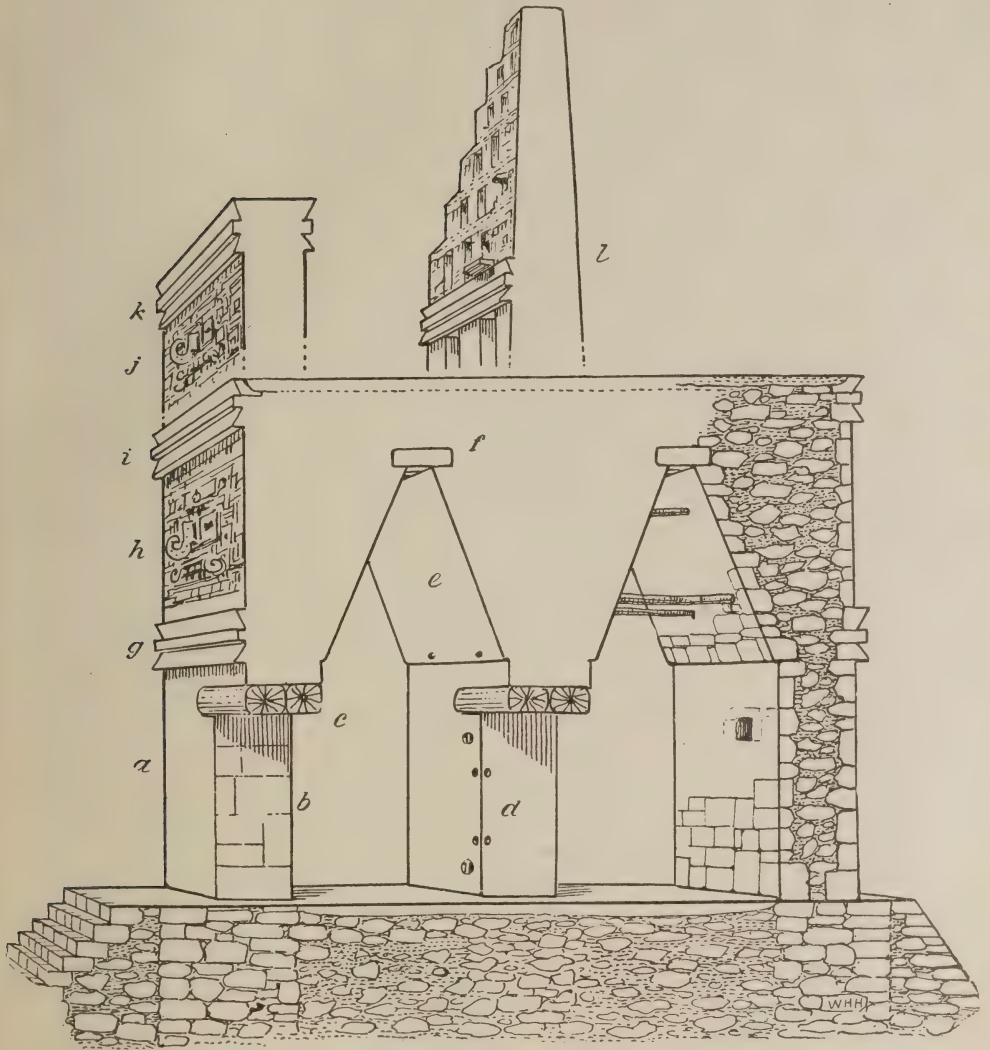


FIG. 5. TRANSVERSE SECTION OF AN ORDINARY YUCATEC BUILDING.

The upper part of the pyramid is shown with the stairway at the left.

- a.* Lower wall-zone pierced by a plain doorway.
- b.* Doorway showing squared and dressed stones of jamb.
- c.* Wooden lintels cut midway in length.
- d.* Doorway connecting front with back chamber and showing position of cord holders.
- e.* Inner face of arch dressed with the slope.
- f.* Ceiling, or cap-stones of arch.
- g.* Lower line of mouldings, a survival of the archaic cornice.
- h.* Decorated entablature zone.
- i.* Upper mouldings and coping.
- j.k.* False front with decorations, (occasionally added).
- l.* Root-crest with decorations, (occasionally added).

ment, and (6) the so-called arched portals or gateways which are not wall perforations in the same sense as the others, but vaulted passageways opening entirely through the building from side to side, and not communicating with the apartments. The latter are described under the heading of *the arch*.

In Figs. 6 and 7, two illustrations of ordinary doorways of the better class are given. They are solidly built and effective. The first is an exterior doorway with heavy stone lintel, and with jambs built of large blocks well dressed and laid. With the serrate lattice-work panels at the right and left—very slightly indicated—the effect is highly satisfactory. The height is seven and the width four feet.

The second is an interior doorway connecting the corridor of a Chichen temple with the sanctuary. The solidity of its construction is a marked feature, and its chief characteristics of design are the heavy pilasters and the three zapote lintels, the middle one, lower than the others, resting on the pilasters. These lintels in a well constructed doorway are usually neatly squared and perfectly fitted to the stone work. Occasionally we find them only partially squared and of meagre length, the spaces left at the ends being filled up with mortar and bits of stone. It is not improbable that such inferior adjustments resulted from the insertion of new beams by indifferent workmen as decay made replacement necessary. Both jambs and lintels in such doorways were often embellished with elaborate sculptures or glyptic inscriptions.

Two fine doorways are shown in Figs. 8 and 9. When the ambitious builders desired to make the portal especially imposing in effect they increased its width and inserted columns or pillars to support the long lintel which was made up of as many sections as there were openings. Fig. 8 illustrates a single round stone column with square cap, supporting the contiguous ends of two stone lintels, the other ends of which rest on square-capped jambs. In the same edifice with the above there are also examples of the use of two and three columns, giving very pleasing effects. Perhaps the most effective and striking style of temple entrance in Yucatan is that sketched in Fig. 9. The opening is some 20 feet wide and 8 feet high, and is divided by two massive columns sculptured to represent feathered serpents; these are fully described in the succeeding section. The lintel in this doorway consists of three sets of beams, two or three to a set. Both the front beam and that facing the corridor are well squared, and the middle beam, when there are three, is less carefully dressed.

Another phase of the wall openings of these buildings is seen in Palenque, where the numerous doorways are so close together that the wall is represented by a series of piers only extending nearly all the

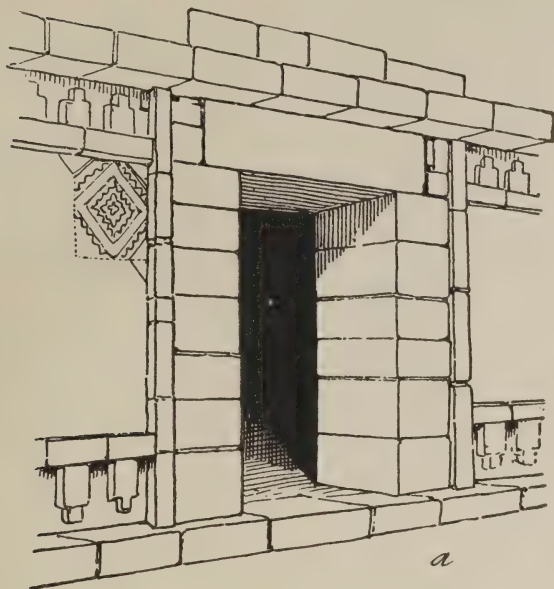


FIG. 6. EXTERIOR DOORWAY.

Of simple form but tasteful finish. The lintel is of stone and the jambs are built of large, well-dressed blocks.

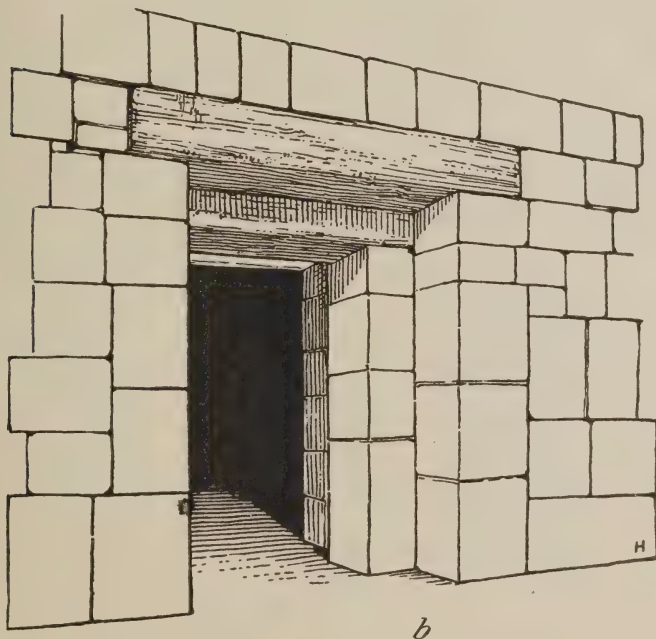


FIG. 7. INTERIOR DOORWAY.

Of massive construction with lintel composed of three well-squared wooden beams, the middle beam resting on the pilasters.

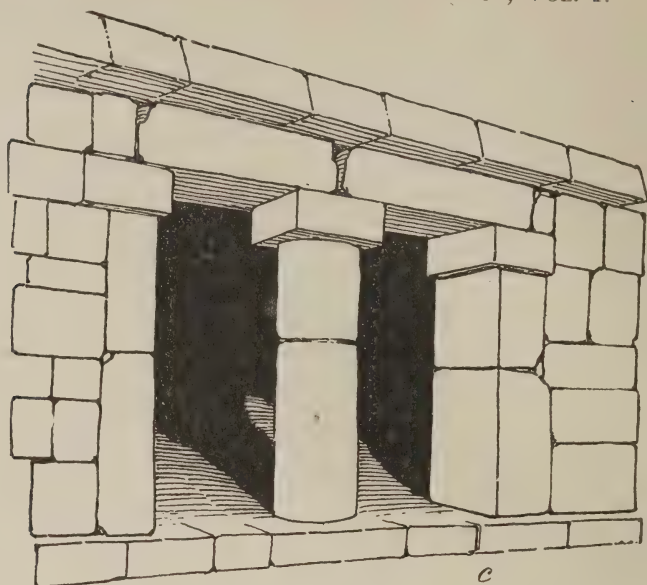


FIG. 8. WIDE EXTERIOR DOORWAY.

Divided by a single round column supporting stone lintels.

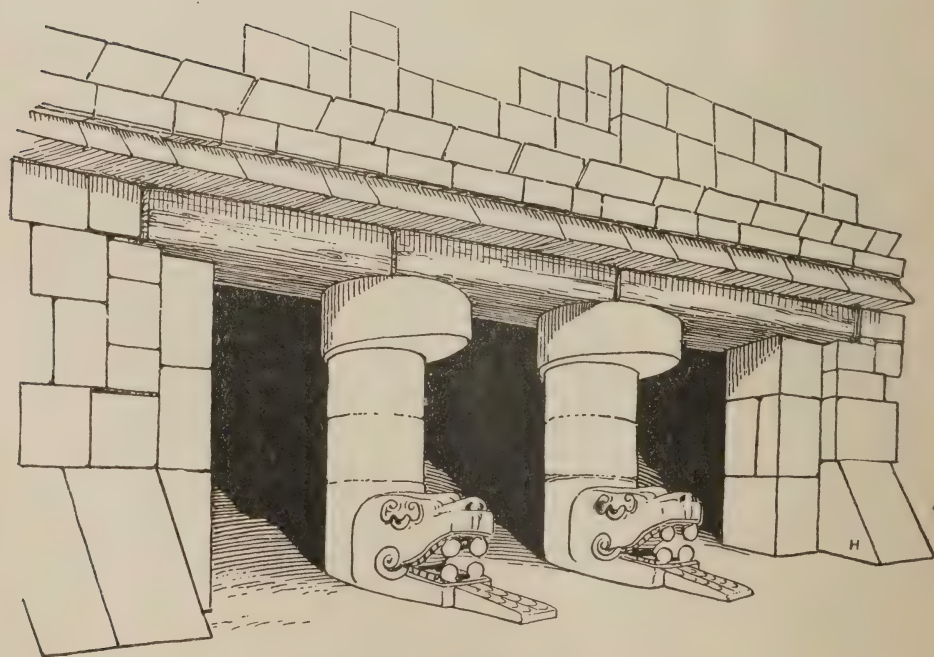


FIG. 9. WIDE EXTERIOR DOORWAY.

Of highest class, with two massive feathered-serpent columns supporting wooden lintels.

way around the building. There are ruined buildings in north-eastern Yucatan which bristle with rows of columns, and it seems probable that in such case the whole structure or a large part of it may have been supported on these columns without enclosing walls, thus leaving continuous openings separated by round columns; naturally structures of this class would fall into ruin before those supported by strong walls. The other varieties of wall perforations, save the minor forms represented by the three examples shown in Fig. 10, are sufficiently described in their proper connections.

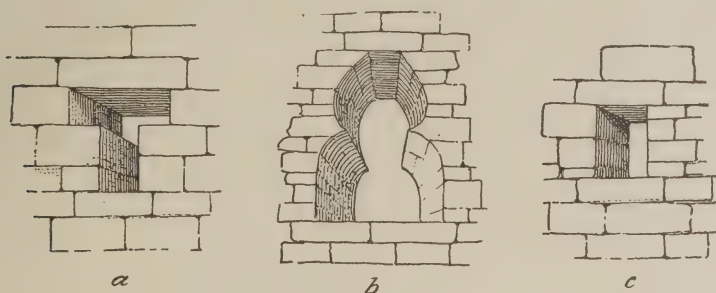


FIG. 10. MINOR WALL OPENINGS.

- a* Represents the tau-shaped opening most common in Palenque; it is seldom more than 20 inches in height.
- b* Is a window-like opening some 6 or 7 feet in height, occurring in partition walls only, in Palenque.
- c* Is the usual form of perforation in Yucatan. It is from 6 to 12 inches in height, and often roughly constructed.

COLUMNS AND PILLARS. Developing *pari passu* with the doorways and arches we have a great variety of pillars and columns. The American column, in the nature of things, exhibits certain parallelisms with the columns of the eastern continent, but in all departures from the most elementary treatment and use it may be said to be characteristically American. Square columns, most numerous in Chichen, are well illustrated in Pl. XVI, and pillars or piers, typically developed in Palenque, were usually simple in form though often embellished with elaborate sculptures or plastic designs in low relief, whilst the round column had advanced beyond the more elemental form with its shaft and simple cap, and was given, in whole or in part, varied and remarkable life forms, the feathered serpent being the favorite motive embodied. Among the most striking features of the great buildings of Chichen-Itza are the massive serpent columns, and on the Island of Cozumel, in a diminutive temple, the life-sized figure of a human being or man-like ape is sculptured in high relief against the face of the column.

Columns were usually assembled in pairs, where introduced into

doorways to support the entablature, but appeared in groups and rows numbering scores or hundreds where extended façades or large roof areas were supported. Few specimens are monolithic, save in the east, as at Cozumel, where the size was reduced to a minimum and the available stone was perhaps more than usually massive. The proportions are considerably varied, but all are short and heavy. The diameter is to the height, approximately, as 1 to $3\frac{1}{2}$. The square column is always built up of a number of heavy blocks.

The round column had become such a familiar feature of the building art that it was employed outside of its normal range of functions, appearing very frequently in the field of pure embellishment. In many of the Yucatec buildings it was used, on a reduced scale, to decorate the façades, where it was effectively introduced in moldings and friezes, forming long rows set in contact side by side. Generally the form was rounded only in front, while the back was flat or uneven and set in mortar. The form was varied in cases by formal moldings encircling the shaft, giving the effect, in a simple way, of our turned balusters.

The genesis of the stone column would seem to be easily made out, as prototypes are found in the wooden and stone roof supports employed in most primitive structures. The association with it of animal forms may perhaps be satisfactorily explained on the assumption that the figures or monsters embodied represent the divinities associated with the temple of which the column formed a conspicuous part. This association is in marked contrast with the more rational use of vegetal forms by the Egyptians and Greeks, though animal forms and figures of men and women were occasionally used in those countries. The association of animal forms with portals and columns was more common in the far East. It is notable that the round column was more generally and freely used in eastern Yucatan, as on Cozumel Island, at El Meco, Chichen, and Ake, than elsewhere. At Uxmal I saw no compound doorways and hence no portal columns, and in fact no columns of any kind, and at Palenque heavy flattish pillars, mere sections of the perforated wall, take their place.

The drawing of a column, introduced as a frontispiece to this paper, Pl. I, is made up from portions of two examples preserved in Chichen-Itza. The close likeness of all the remnants of this class found here makes it apparent that the type was well established and uniform in fundamental features, so that a composite derived from two or more specimens may give a very correct notion of this remarkable feature of the Chichen temples. The head, or base, is drawn from a well-preserved specimen in the Temple of the

Tigers, Gymnasium group, and the shaft and capital—the body and tail of the serpent—are drawn from this and from specimens supporting the entablature at the eastern entrance of El Castillo. The position of these columns in the temples is fully described and illustrated in the accompanying pages. The massive head, projecting forward at the side of the portal, almost meets the upper end of the balustrade of the stairway, which also terminates in a similar head at the base below. The extended tongue, preserved in several cases, is two feet or more in length and is made of a separate piece of stone fixed in the end of the lower jaw by means of a tenon. The attitude of the head is indicative of alertness and ferocity, the mythic monster being strongly characterized. The mouth is open, showing fangs above and below and rows of teeth at the sides. There are also characteristic palate, throat and tongue markings. A coiled appendage issues from each corner of the mouth and rests against the jaw—a feature seen in many of the sculptured monsters of this and other sections of Mexico. The nostrils are forcibly suggested and the eye is especially characteristic of the rattlesnake. The eyeballs, in one case at least, were made of white polished sea shell. The pupil was probably painted black or formed of some dark material set into its place with cement. An eye socket, seen in an example in the Temple of the Tables, is ten inches long. The head is entirely covered with neatly sculptured scales. The body or shaft is short and thick and formed of two sections of stone aside from the base section. It is elegantly finished in low relief, the sculpturings representing bands of feathers above (exterior surface of the column), and characteristic ventral markings beneath (inner surface of the column.)

The capstone is the tail of the serpent, which turns abruptly out, extending beyond the lintel, and terminates in a somewhat blunt point, not preserved, however, in any of the principal examples, as the falling of stones from the façades above have broken it away. It is my impression, formed from a study of various serpent sculptures, that the tip of the tail was given its characteristic rattle markings. The inner part of this caudal-capital is rounded to conform to the curve of the column, as seen in the Castillo examples, and strangely enough, contains reliefs of a row of dwarfish, bearded Atlantean figures in elaborate costume, placed in the attitude of supporting the lintels. It is probable that I have erred in carrying the outer of the two figures, shown in the plate, so far beyond the front margin of the lintel, as the idea plainly was that these figures, four of which remain in one case, should appear as supporters of the superstructure and not merely as decorations. The general shape of the outer extremity

of the tail is probably correctly given in the example illustrated in Fig. 40, though it is, I believe, unsculptured; possibly it was unfinished. Portions of the lintel timbers and entablature above are shown in section, and the relation of these features with the corridor and façade is shown in several subsequent cuts, as for example in Fig. 31.

The dimensions of the columns utilized in this reconstruction are about as follows: The head (base) of the Temple of the Tigers example is 7 feet 4 inches long and about 4 feet wide at the muzzle and 4 feet high. The height of the remnant of body (shaft) as it stands is 7 feet 7 inches. The whole height, if it is allowed that one shaft stone and the cap are missing, was close to 10 feet. The diameter of the body or shaft I failed to secure, but it is not far from 36 inches. The El Castillo column, used in completing the upper part of the drawing, is not so large. The diameter of the shaft is 25 inches and the full height to the lintel 7 feet 9 inches. The striking character of the Chichen temple portal and its columns, before mutilation took place, is indicated in Fig. 9. When in a perfect state of preservation and appropriately colored it must have presented a very effective and handsome appearance.

THE ARCH. The Maya arch presents a number of interesting forms and phases, all, probably, directly traceable to the more primitive forms of chamber spans or vaults in common use all over America. Among these earlier forms we have, first, the beam of wood or slab of stone connecting two lateral supports or walls and forming part of the roof or serving to support it; second, the single lean-to, in which the parts are placed against some fixed vertical surface or support; third, the double lean-to, where opposing parts are set against each other with or without a ridge pole; and, fourth, the circular lean-to, in which the parts form a cone with or without a central supporting pole. All are equally elementary, and it will be impossible to determine just which varieties contributed most toward the development of the higher forms of vault in use among the Mayas. There are, however, but two principles of construction involved in all of these spans—the horizontal span and the lean-to. The latter is never used alone but occurs in combination with the former.

The prevailing form of Maya arch is based on the horizontal span, employing not single long slabs, but a series of short slabs so placed as to bridge the void by degrees. A course of stones is laid along the top of each of the opposing walls, projecting a little, a second course is laid in like manner, and others follow until by a series of offsets the sides have approached to within a foot or two, when a course of large well-squared slabs is laid across, completing the span.

In examples employing the lean-to principle, the construction is the same up to the point of connecting the closely approximate walls. Instead of laying a course of flat capstones across, two courses were employed, set on edge on the upper courses of the walls and inclined together at the top, continuing the pitch of the walls and forming the true cuneiform arch. The object of the off-setting is, of course, to reduce the span of the void, thus permitting the use of ceiling stones of small size instead of large and long stones which were hard to obtain and easily broken, or beams of wood which soon decayed. These arches really represent the emancipation of the Maya builder from the thralldom of the wooden beam. The prevailing variety was used in all forms of chambers and also in certain large vaulted passages, as in the Palace at Uxmal, and occasionally in smaller openings, as at Palenque, but the flat span or lintel remained in nearly universal use for ordinary doorways. A unique appearing arch is found at Palenque, the sides being curved in such a way as to give a somewhat trefoil effect to the opening. The principle of construction is, however, the same as in the prevailing form of the cuneiform arch, the profile being curved instead of straight.

It is evident that considerable difficulty was experienced in carrying up the long slopes of the larger vaults, and the high angle adopted was one means of lessening the tendency to collapse. The projecting stones were largely held in place by the masonry of the body of the wall, which was carried up at the same time, but even this, especially in cases where the outer surface was also inclined, could not have prevented the frequent falling of the work when approaching the apex. In meeting this difficulty it was a common practice to use timbers—generally poles of medium or small size—which were placed across and built into the masonry as it rose, holding the walls apart. These beams are preserved in hundreds of cases and nearly every vault shows by its numerous beam sockets that this device was extensively relied upon. I believe the theory is advanced by some writer that a core of masonry was first built of the proper shape, and the vault constructed over it. I doubt if the numerous examples of masonry-filled apartments observed are satisfactory proof of this, but a careful examination of the surface finish in a room so filled might readily settle the question.

In Fig. 11 I present sketches of six examples of the Maya arch. These do not cover the entire ground, but others so far as I have seen are merely variations of the two prevailing types, shown in *a* and *b*, the first, terminating above in two rows of inclined slabs, forming the apex, and the second closed with a course of horizontal slabs. The former is seen in Chichen-Itza, but is rare elsewhere, and the

latter was almost universally used in chamber vaults. The specimen shown in *c* differs from *b* only in having the corbellate or offset margins of the stones dressed with the slope, making a plane surface. That given in *d* is identical with the preceding, save that its inclined faces are slightly curved; it is the form sometimes used in the portal vaults which open through one or more of the buildings of a quadrangular group communicating with the court. It is seen also in chamber vaults, in bridges and aqueducts. The fifth example *e* is also a portal vault typically developed in the Governor's Palace, Uxmal; indeed I cannot say that other illustrations are known. The slopes are long and it is probable that they were intended to be straight though now considerably warped, possibly by sagging. The sixth specimen *f*, is the trefoil arch of the Palace in Palenque, which is the most ambitious attempt at arch elaboration in America, and shows, in connection with kindred wall perforations in the same building, an up-hill struggle of the æsthetic in a field where construction was only blindly feeling its way.

The arch was rarely employed in ordinary doorways, exterior or interior, the few cases at Palenque being exceptional. The flat form of opening was preferred because the prolonged apex of the cuneiform arch led to troublesome complications with the interior vaults, as well as with the exterior medial moldings and the ornamented zone of the entablature.

It may be added that in numerous cases all four walls of the chamber are made to approach toward the apex of the vault, thus more thoroughly distributing the thrust of the superincumbent masonry.

The Maya builder did not often essay to construct his arch over a space more than twelve feet wide, though in the loftier buildings a much greater span was possible even with the ordinary pitch of the opposing walls. The average incline appears to be about 65 degrees, but occasional examples rise to 80 degrees, while others fall to 60 or even 55 degrees; the latter pitch would, however, give a weak construction, as the outward thrust would be increased to a dangerous degree. A building 24 feet high with roof 3 feet thick would accommodate a vault 21 feet high. If the vertical walls below are carried up to half this height, which is perhaps not far from the average relation of upper and lower spaces, an incline of 65 degrees in the opposing walls, allowing 18 inches for the capstone span, will give a vault 9 feet in width, or nearly ten feet, measured on the floor level, as there is usually an offset at the spring of the arch of from 3 to 6 inches on each side.

In the vaulted passageways through the Governor's Palace at

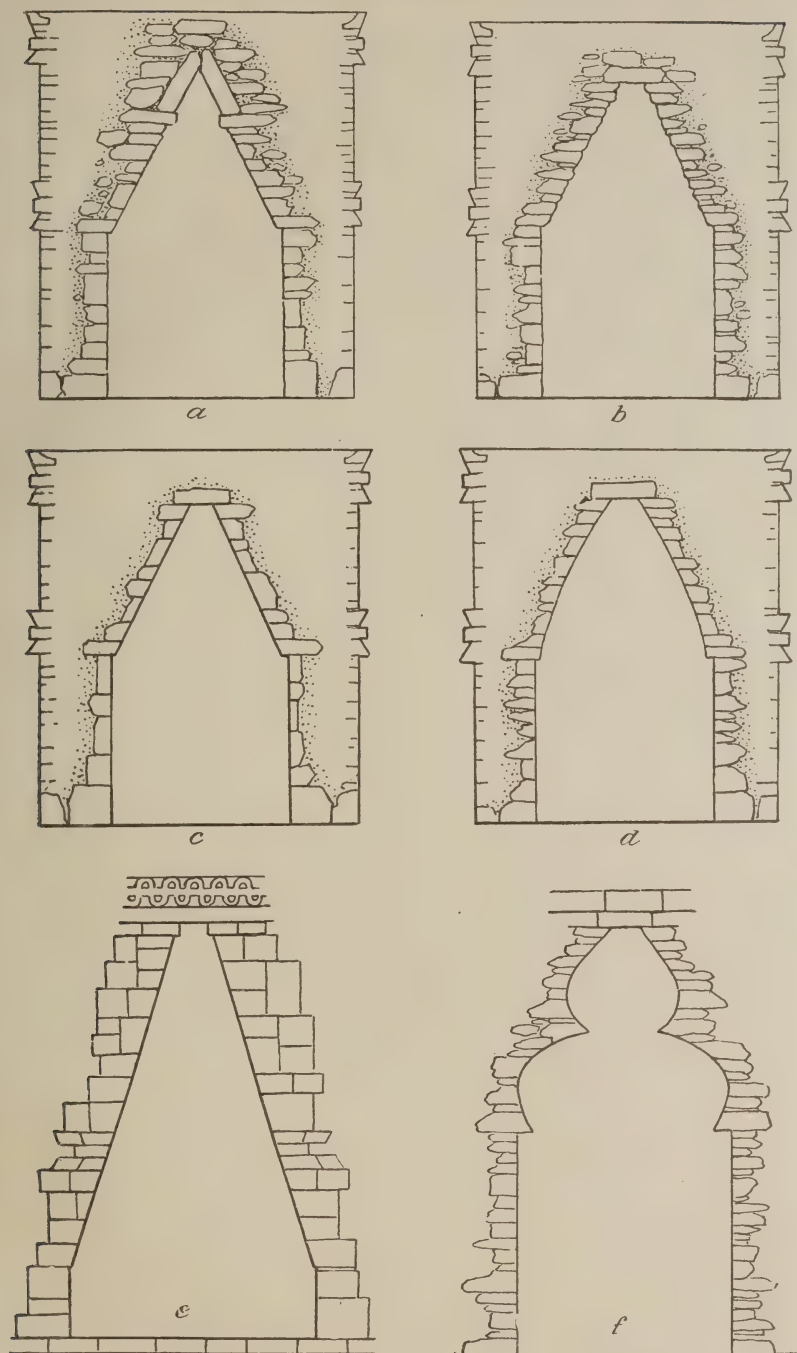


FIG. 11. EXAMPLES OF MAYA ARCHES.

- a. Section of cuneiform arch with acute apex, Chichen-Itza.
- b. Section of ordinary arch with flat capstone.
- c. Section of ordinary arch with dressed surfaces.
- d. Section of ordinary arch with dressed surfaces and curved soffit slopes.
- e. Portal arch with long slopes, showing masonry of exterior facing.
- f. Section of trefoil, portal arch of Palenque.

Uxmal the incline of the arch begins within a few inches of the ground, so that in the long rise of 20 feet or more, even with the high pitch of 70 degrees, the width spanned is not far from 18 feet. The highest arch met with in my own investigations is in the outer annular chamber or gallery of the Round Tower at Chichen. The height is about 24 feet, while the width is only six feet; the pitch of the vault walls is therefore unusually great, and the apex correspondingly sharp. A fuller analysis of the arch and its development will be given at the close of Part II of this paper, in connection with a study of the origin and development of the stone building art of Central America and Mexico.

ORNAMENT. It is impossible to say of the ornamental art of any primitive people just what causes have operated to bring it into existence, or what ideas underlie its varied phenomena. We discover in the non-essential elaborations of these ancient buildings numerous elements surely traceable to constructive sources, but we further perceive that most of the motives employed in embellishment have their origin in religion, that their use in art was first significant and second æsthetic. It is probably safe to say that in Maya ornament nine-tenths of the elements used are, or were, present on account of their significance, or because of some associated thought, although we cannot say just how much of the original meanings were retained by the advanced peoples who continued to employ them in their buildings. It is almost certain that every life form that entered into the embellishment of temples and palaces was employed because it occupied some place in the mythologic symbolism of the builders. The serpent, the tiger, the turtle, the bird, the monster, represent mythic conceptions. Men were deities or their representatives or were depicted in scenes that relate to rites or duties of a religious nature. We may go further and premise that very many of the purely conventional designs, the scrolls, the frets, the meanders and the zigzags had meanings, hidden to the uninitiated, coming down from their less conventional phases of development. It is pretty certain that even in the latest periods of Maya history the various motives employed in decoration were not only significant, but that they were not used out of their traditional or appropriate associations, and when we see a life form or even a non-graphic device associated with a given structure we may fairly assume that it has, or had, a special significance and function in that connection.

The housing of gods and men is a simple thing and requires little more than walls and a roof, but the demands of symbolism and æstheticism make building a complex and wonderful art, adding three-fourths to the labor and cost of construction, and imposing

nearly all there is of elaboration or display. Symbolism places the figure of a divinity at the entrance to a temple because its functions are best performed in that situation, and its sculpture may be of the simplest kind, but the love of display modifies the figure, introduces it into the construction and multiplies it without limit, carrying it in rows along the walls and in panels from top to base; it heightens the walls and adds lofty pinnacles and crests to make room for increased display. Superstition modifies the column that supports the wide entablature of the temple gate, making it resemble the form of a feathered serpent, a mythic compound probably representative of a chief divinity, but only a well-developed sense of the beautiful could refine the form and array the folds, feathers and scales of the monster in varied and graceful combinations. Symbolism associates certain conventional figures, as the scroll and the fret, emblems of wind and wave, with the figure of the god of water or of the air, but æstheticism carries scroll work and fretwork over all the available spaces and multiplies and beautifies the idols until we have a maze of varied, yet withal—we may assume—ideographically consistent embellishment. Notwithstanding this general consistency, which tradition struggles to preserve, the æsthetic impulse was surely gaining ground and little by little overstepping the traditional bounds and asserting for itself the right to make things beautiful at whatever cost to significance or traditional usage. A somewhat detailed analysis of Mexican and Central American architectural ornament is reserved for the second part of this paper, as the necessary illustrations are not yet ready.

All the sculptor's work is crude as compared with civilized art, but it is virile and, to my mind, full of promise of higher achievement. Portrait sculpture was probably not practiced, or if attempted the form of expression was so conventional as to rob the representation of marked individuality. Sculpture found its subjects almost wholly within the animal kingdom, and, though we observe that species were portrayed with some degree of truth, it is apparent that with creatures as with human beings, mythic characters were of more importance to the sculptor than the realistic.

Graphic art seems to have covered pretty much the whole field of nature and art, presenting men, animals, plants and nature generally with rude vigor. Extensive subjects in bright colors, covering the walls of some of the chambers of Chichen include village scenes and battle pieces strongly suggesting the work in some of the ancient manuscripts. There is a lack of perspective, and a mixing up of sizes, and the general style of presentation is suggestive of that of the ancient Egyptians.

HIEROGLYPHS. It is not my purpose to attempt a study of the

glyphic characters, seen in considerable numbers in all the principal cities. They may readily be examined as to their general characteristics as sculptured or plastic devices, but their interpretation is a totally distinct matter and fraught with formidable if not insuperable difficulties. Looking toward the latter end, however, numerous students have begun the work of collecting and collating them, and important results have been accomplished by Stephens, Charnay, Maudslay, Seler and Thompson in the field, and by Thomas, Brinton, Förstemann, Schellhas, Valentini and others utilizing mainly the graphic and plastic copies brought together in libraries and museums.

There can be no doubt that they are representatives of a system of writing, which, though necessarily in its infancy, was entering upon the phonetic stage. The characters are, however, highly developed and complex in their constitution, a single sign employing several elements, and so fully condensed or conventionalized that the original realistic characters are largely obliterated. The most strongly marked variation from the typical "calculiform" figures is seen in Uxmal, where inscriptions in the central over-door decoration of the Governor's palace and in the Temple of the Magician are less compactly grouped, as if more archaic in character, or as if treated merely as a means of decorating the spaces occupied.

At best the sculptured inscriptions are but brief. Even the longest are limited to a few hundred characters, and the highest possible values of phonetic or ideographic elements would not enable them to express more than a few brief statements. Interpretations, if finally made, will be exceedingly interesting, but as historical records little can be reasonably expected of the inscriptions. They may be names, titles or decrees of rulers, but more probably relate to priestly matters, marking dates or indicating the nature of rites and ceremonies. They were probably understood by the priesthood almost exclusively, and before the Spanish conceived the notion that they were worth preserving the key was lost.

Technically considered, the glyphic characters of the several Maya provinces do not differ greatly save as a result of the varied nature of the materials in which they are executed. Preserved examples are usually in stone, but stucco was extensively employed in some sections, as at Palenque, and wood was certainly much used throughout the whole Maya territory. As a matter of course the same forms of writing were executed in color on walls, parchment, paper, etc., and to a far greater extent than in plastic methods. The sculptured figures are in low relief where hard stone or wood was used, and are much more boldly defined when sculptured in soft stone or modeled in plaster. In Yucatan they are very generally associated with door-

ways, columns and pillars, lintel faces being preferred, but they are found in various situations.' At Palenque they are engraved upon the heavy stone steps of the Palace courts and occur most frequently associated with devotional groups of figures set into the walls of sanctuaries. The numerous stucco groups covering the pillars of the temples are generally accompanied by a few stucco glyphs and some of the pillars are devoted entirely to these inscriptions. The general character and appearance of the glyphs is shown in the specimen illustrated in Pl. VII. The Yucatec Mayas introduced glyphs into their sculpturings less profusely than did their southern brethren and the work is less refined and elegant. There appear to be no very closely analogous forms of glyphic writing in any other part of the world.

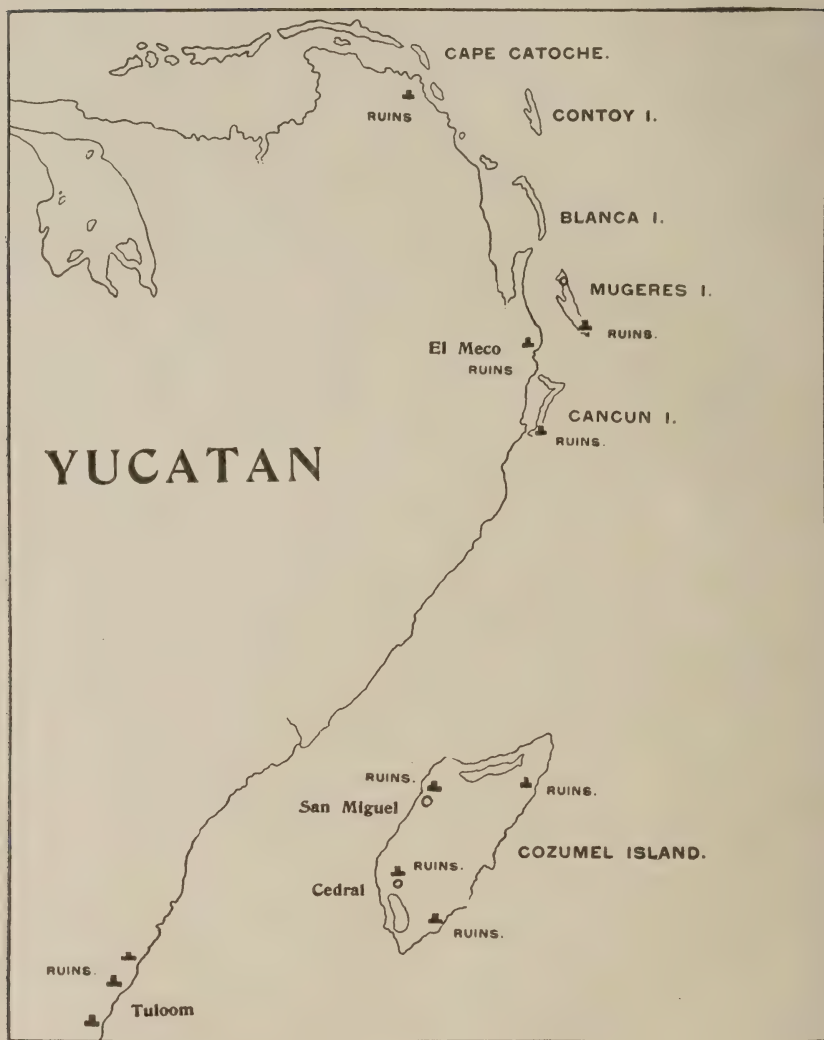


FIG. 12. SKETCH MAP OF THE SHORE AND ISLANDS OF NORTHEASTERN YUCATAN.

RUINS OF EASTERN YUCATAN.

The voyage to the eastern islands and shores of Yucatan was looked forward to by our party with exceptional interest, as the region had been but little visited by students and there was promise of numerous novel features in all the fields of observation and especially in archeology. Besides, it is a land of much reputed beauty and is rendered romantic by tales of recent piracy. The northern shore of the peninsula is low and monotonous, and not attractive to look upon, but is said to be dotted with numerous ruins and ancient dwelling sites. These were passed by with much regret, but the time at our disposal did not permit of the study of minor remains or warrant the exploration of fields with respect to which so little was positively known. Rounding Cape Catoche on the 29th of December, we reached the low island of Contoy, and stopped for an hour to visit a recent wreck, cast by the strong current of the Gulf stream upon the low reefs of the island.

MUGERES ISLAND.

Next south of Contoy comes Isla Mugerres or Woman's Island, a narrow strip of coralline limestone some five miles long and less than one mile in width, generally low but rising at the south end into a narrow promontory some sixty feet above the sea. At the north it is partially connected by a line of rocks and sunken reefs with the islands to the northwest. Our boat was piloted across this dangerous line of rocks at a point near what is known as Anvil Rock and anchored in a shallow little harbor on the west side of the island, fronting the village of Dolores, an humble fisher settlement of some 500 inhabitants. The village faces the harbor and extends back through sheltered and luxuriant groves of cocoanut palms some three or four hundred feet, to the sandy ridges bordering the sea on the outer side of the island. The island is skirted by ledges of sponge-like and cavernous limestone of recent formation, save in and about the harbor of Dolores, which is bordered by a low sandy beach.

So far as we could learn the only ruins on the island worthy of note are at the south end, and these were reached by means of the gasoline launch, from which we landed with some difficulty on the

rocky shore a little above the southern point. The promontory is very abrupt and is worn by the heavy seas into picturesque pinnacles, caverns, arches and rough outstanding masses of rock, as imperfectly in-



FIG. 13. SKETCH OF THE SOUTH END OF MUGERIS ISLAND, SHOWING LOCATION OF RUINS.

indicated in Fig. 13. Ascending the rugged bluff and skirting the cliff to avoid the tangle of undergrowth, we encountered a small ruin near the margin of a depression in the bluff about three hundred yards from the outer point. The fallen walls were overgrown with a variety of cactus apparently peculiar to the locality and described by Stephens as flourishing on the same spot fifty years ago. As that explorer barely mentions the ruin, I present a sketch plan, Fig. 14, which shows the building to have been a small temple or shrine, with terraced base of eccentric outline, ascended by two narrow stairways having six or seven steps each. The terrace is from five to seven feet in height and some twenty-five feet in length and width. The ruined walls of the minute shrine occupy the middle of the substructure and are ten feet square, and from three to four feet in height. There appear to have been doorways on all of the four sides. The steps are of cut limestone and are retained by balustrade walls level for a short space at the top and sloped with the stair below. The masonry consists of irregular stones laid up rather carelessly in mortar, and the faces, where not originally even, were roughly dressed. The whole surface was probably evened up with mortar and possibly painted.

Passing outward along the grass-covered promontory, here quite narrow, we reached the principal ruin, Fig. 13, and Pl. III, which is a prominent and striking feature of the landscape and a valuable landmark to every sailor of these seas. This temple—for such it may be called—has been about one-third destroyed by the sea. Nearly four centuries ago the fleet of Cortez sought refuge among these islands and

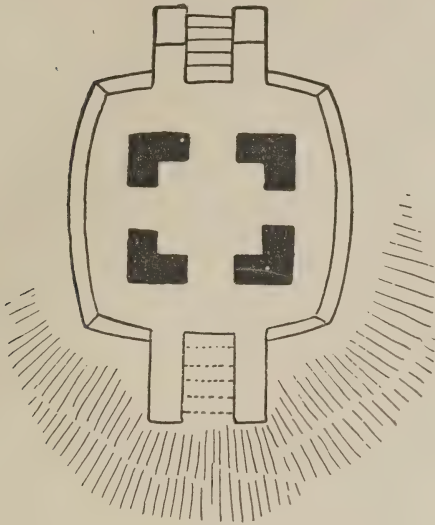


FIG. 14. GROUND PLAN OF SMALL STRUCTURE NEAR SOUTH END OF MUGERIS ISLAND.

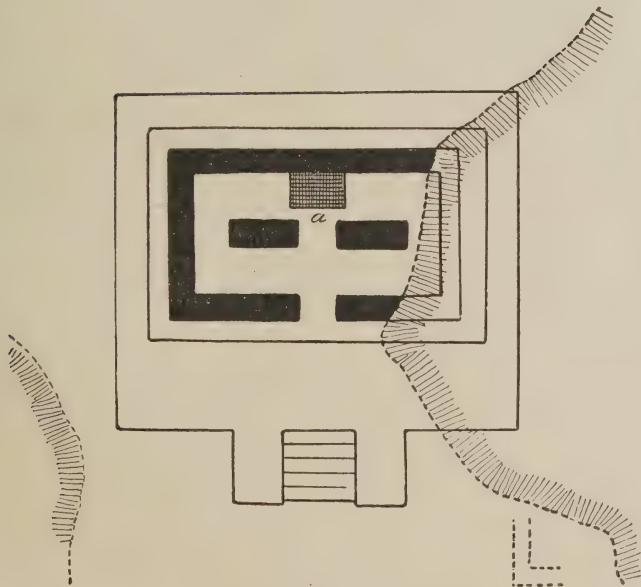


FIG. 15. GROUND PLAN OF RUINED TEMPLE AT SOUTH END OF MUGERIS ISLAND.

found upon one of them, possibly Mugerés, numerous temples in which the idols worshiped represented women; the name thus suggested has fixed itself upon this island. This building was no doubt entire at the time of this visit and it is probable that there was considerable space between the base of the low terrace and the sea cliff on all sides. The destruction of the point of the promontory appears to be going on rapidly at the present time, as the waves break with great force from both sides against the underlying beds of soft limestone, undermining the harder stratum at the top and causing it to fall in great masses into the sea. The masses are quickly broken up and disintegrated and deposited as sand along the shore. At present the remnant of the temple extends from margin to margin of the promontory, a width of perhaps forty feet. This distance will soon be cut through, and the outer point, which is wider and extends some sixty feet southward from the front of the building will soon be broken down. It is apparent that originally the plan was symmetrical, as shown in Fig. 15, where the dotted lines indicate the portion lost in the sea. It does not seem unlikely that one hundred years from now the ruin and the whole point beyond it will have forever disappeared from view. That the last fifty years have dealt kindly with the structure, however, is apparent from a comparison of the photographic illustration presented in Pl. III, with the engraving* given by Stephens in Vol. I of his Yucatan.

The terrace substructure—an incipient pyramid—was originally about thirty feet long, twenty-five feet wide and four to six feet high. It is composed mainly of loose stones, with perhaps a little mortar, and is faced with large blocks, some of which have been pretty evenly dressed. Many of these stones are large, one near the outer southwestern corner measuring five feet six inches long, three feet six inches high and more than a foot thick. The narrow steps, five in number, ascend the middle of the south face of the terrace between heavy projecting walls. The superstructure is set back eleven feet from the terrace front and about a foot from the other margins and has all around it a step one foot high and from twelve to twenty inches wide. The elevation of the building and the nature of the masonry and exterior elaborations are well shown in Fig. 16. By reference to the plan, Fig. 15, it will be seen that the doorway, which is low and narrow, enters an outer chamber or vestibule from which a second door of like character opens into a back chamber at a point just opposite a low altar or shrine, *a*, while side doors at the right and left admit visitors to the ends of the

*Incidents of travel in Yucatan. Opposite page 416.

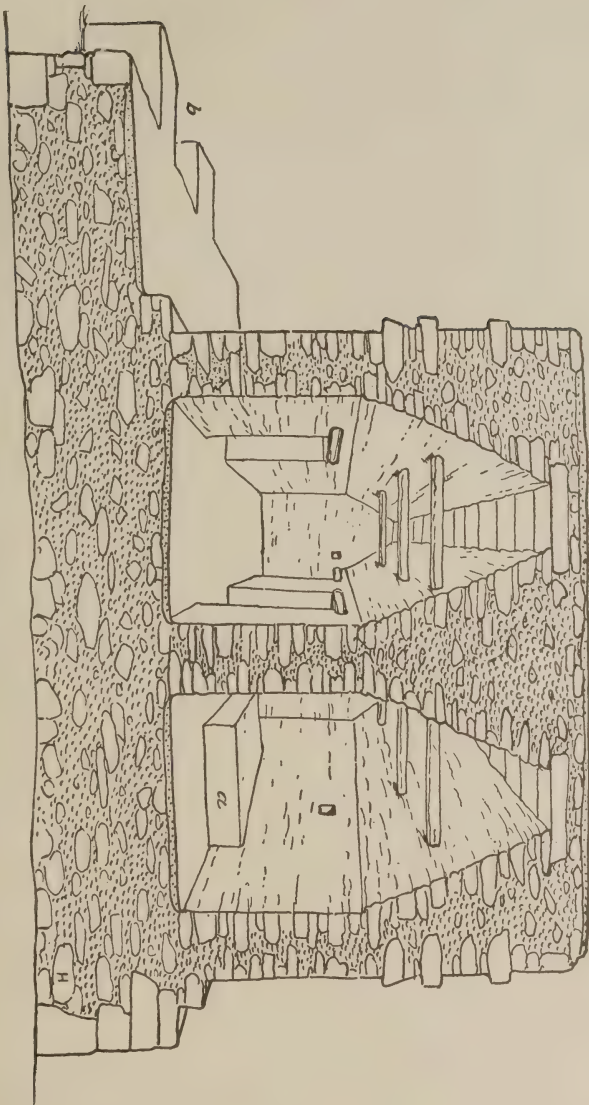


FIG. 16. GRAPHIC SECTION OF SMALL TEMPLE ON SOUTH END OF MUGERRES ISLAND.
Showing character of construction and appearance of chambers.
a. Altar.
b. Stairway.

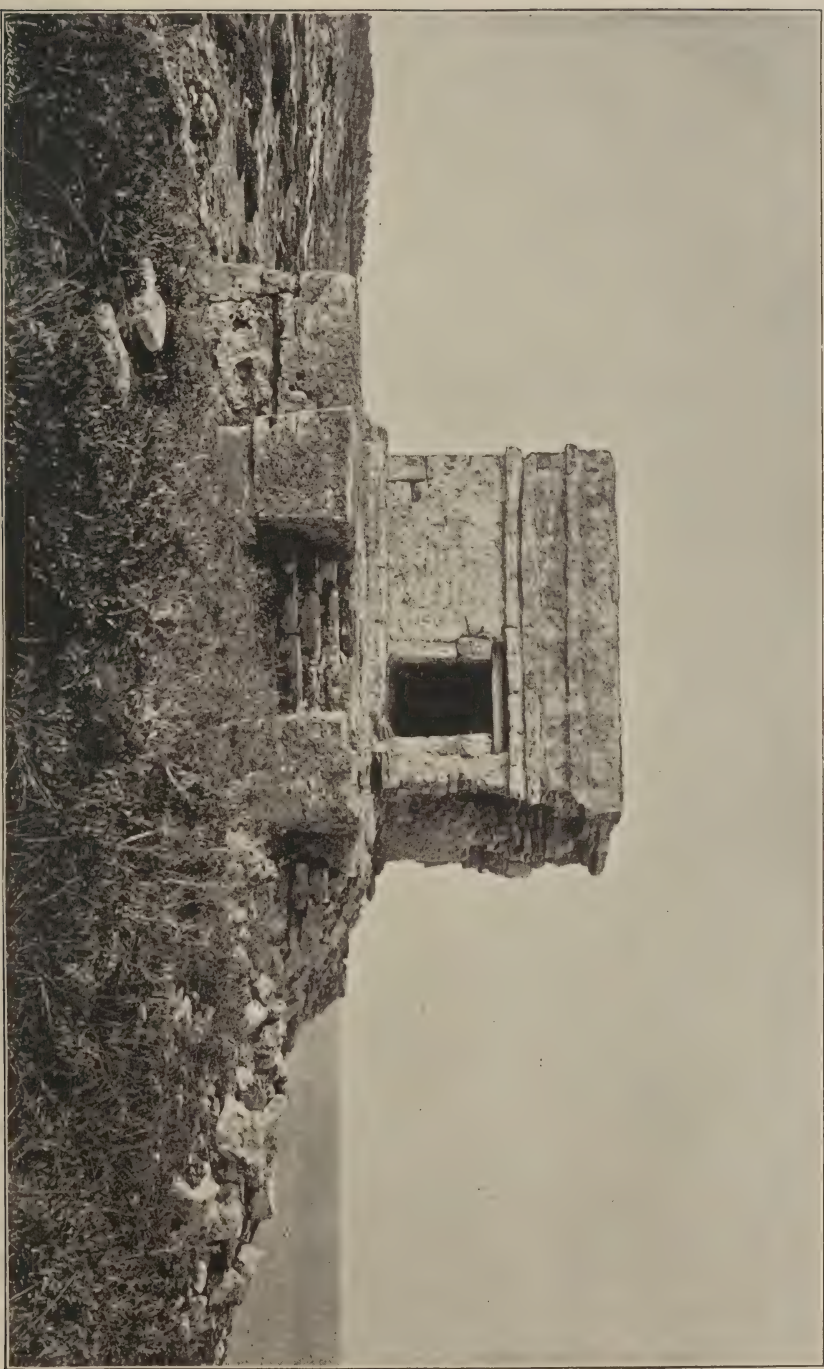
altar. The appearance and construction of the whole interior are made sufficiently clear in the illustration, Fig. 16, where the terrace, the cement floors and the peculiar masonry are clearly indicated, and the walls of the chambers, the holes in the wall, the wedge-shaped arch, the wooden beams and the altar are given in nearly their correct relations and proportions. It is barely possible that this altar is of Spanish origin, as the conquerors are said in cases to have forced the native workmen to make changes in their temples to fit them for Christian worship.

The lintels are small, round or partially squared beams of wood, probably zapote. There are two over the outer doorway, three over the central doorway, and four over the remaining side doorway. Small unhewn timbers are set into the masonry of the arch about half way up, as if to steady it while construction was going on, or to serve for suspending property or hangings. They were originally eight in number; five are in place at the present time, the left hand front one being restored in the section. At the sides of the doorway there are rudely made anchor holes drilled in the stone and probably used for fixing curtain cords. In the wall over the altar is a small rude opening, and another appears in the west wall. The walls are plastered up to the spring of the arch, a height of about $4\frac{1}{2}$ feet, but above this they are rough and seem never to have been covered. The connecting stones of the arch at the top are slabs of limestone, exposed for about twenty inches in width, and long enough to extend some distance into the masonry at the sides, thus binding the arch. The roof is flat and roughly plastered, as are the outer walls. The whole height of the superstructure is about twelve feet. A little out-building near the southeast corner of the terrace is nearly levelled with the ground and partly fallen into the sea. It is of later construction than the main building, as the mortar is filled with potsherds derived no doubt from the sand in front of the temple. Meagre remnants of another building are observed upon the brink of the cliff a few yards to the west of this temple. But little can be learned of the original nature of the structure.

The rocky floor of the point in front of the temple steps is partly covered with debris and soil which are filled with potsherds. The ware in general seemed rather rudely made and shows a coarse, gritty matrix. The surface may have been well finished, but is nearly all removed by weathering. The forms include vases of usual Yucatec outlines and many rather elaborate figurine or idol vases. Several of the latter represent the female form, a fact apparently confirming the observations of the early Spanish explorers already referred to. This pottery is identical with a principal variety found on the main-

PL. III. RUINED TEMPLE, SOUTH END OF MUGERES ISLAND.

About one-third of the building, at the right, has fallen into the sea, the doorway having been originally in the middle of the façade. The cliff on the opposite side approaches within a few feet of the corner of the terrace. The masonry is crude and roughly coated with plaster. The narrow stairway is set between two massive buttress-like balustrades. The slightly sunken wood lintel is plainly seen, and the crudely finished, simplified moldings appear above. Full length of building proper about 25 feet; width, 14 feet; height, 11 feet. View from the south near the point of the promontory. This and several of the succeeding plates are from photographs made by Dr. C. F. Millspaugh.



RUINED TEMPLE, MUGERES ISLAND.

land of Yucatan and especially along the adjacent eastern shore, excellent examples of which are to be seen in the Museum at Merida.*

It was observed that the buildings on this island, although identical in plan and style with those of the mainland, are of small size and inferior construction and give a suggestion of meagreness and inferiority, as if they represented the mere outposts of Maya culture; yet this does not agree with the Spanish accounts, which make these islands a kind of religious centre, a Mecca, resorted to constantly by thousands of devotees from the mainland.

ISLAND OF CANCUN.

In passing south from Mugeris island to Cozumel, a halt was made near the north end of the Island of Cancun—which is a long, low strip of land showing here and there exposures of coralline limestone—to visit some of the numerous ruins, said to have been seen from passing ships, crowning the sandy crest of the island. Taking the little launch we passed behind the island through a narrow channel, and crossed a lagoon-like body of water to a point perhaps a mile above the southern extremity of the island. Here we encountered remains so extensive as to indicate an important settlement. They occupy a low, level space some hundreds of feet wide between the swampy western shore and the high sandy ridge bordering the surf-beaten beach on the east. The spot is occupied by an Indian hut, apparently the only habitation on the island, and is rendered attractive by a group of cocoa palms and patches of Indian corn, which occupy clearings in the dense undergrowth that covers the island. The buildings have been quite numerous and apparently identical in character with those of the neighboring islands and mainland. They are, however, in such an advanced state of ruin that it was not considered worth while to attempt to describe or illustrate them. The cut stone of the walls has been largely removed for building purposes. There were half a dozen pyramidal piles in the group, in which well-built walls and stairways of hewn limestone were visible, and numerous round columns were scattered about. Some of the buildings represented were no doubt temples, but, judging by the masses of debris, they were not of great architectural pretensions. Back one hundred yards from this group a somewhat more massive pile was encountered covered with dense forest. The pyramidal base is some

*I did not happen to see a paper by Stephen Salisbury, Jr., entitled "Terra Cotta Figures from Isla Mugeris," published in the *Journal of the American Antiquarian Society* for April, 1878, until these pages were in type. The ruin is well described and illustrated and excellent cuts of the pottery are given, the data having been furnished by Dr. A. Le Plongeon.

sixty feet long by forty feet wide and fifteen or twenty feet high. Remnants of thick, rude walls on the top indicate a structure not specifically different from those on Mugeris island. An hour's ramble through the dense growth of young forest and vines, and along the sandy ridge, developed nothing more save a pile of large, partly hewn stones near the eastern beach, opposite the group of ruins referred to above.

ISLAND OF COZUMEL.

The island of Cozumel—see map, Fig. 12—is situated sixty miles down the coast from Cape Catoche and is separated from the mainland by a shallow but charming bay from five to seven miles wide. It is twenty-three miles long from northeast to southwest and upward of eight miles wide. It is low and covered with dense forest, rendered almost impenetrable by tangled undergrowth. As far as our observations extended, the surface rises hardly more than twenty-five or thirty feet above the sea. The geological formations consist of horizontal, heavily bedded limestone of recent date, the inclosed fossil remains duplicating in many cases the species now thriving along the shore. It is probable that the sand ridges of the eastern shore rise higher than the limestones of the western side, and on the north and south they enclose considerable lagoons. The island is sparsely inhabited, containing less than 2,000 people, who live in the simplest possible manner, content to fish and raise chickens and to cultivate small fields of corn and groves of bananas. They are assembled mainly in the village of San Miguel, situated on the inner side of the island near the northern end. Spanish fishermen of Cuba have dominated in the district for a long time, and the native Maya element is as a result quite degenerate, and retains fewer traces of the ancient language and customs than in other equally isolated portions of Yucatan.

The island has always been reputed to contain numerous architectural remains of importance, and the earlier Spanish records tell of imposing temples and of worshipers in great numbers. Ruins have, been located by casual observers in various parts of the island, but little is on record up to this time. Stephens visited the site of San Miguel in 1840 and found the island entirely deserted. He examined some ruins in the vicinity but attempted nothing more. On page 373 of his *Incidents of Travel in Yucatan* a cut is given of a well-preserved temple of small size, located on the site of the village. Two other structures are mentioned, all of the usual type. His references to the statements of the first Spanish visitors are very interesting, and his interpretations are no doubt in the main correct. The build-

ings described by him are, however, not to be found. In front of the ruins of the ancient Spanish church of which he speaks at length there is only a shapeless mound to represent the temple at that point. Later the LePlongeons landed at the same spot, explored what remained of the ruins, and visited one or two other sites farther down the island.

RUINS AT SAN MIGUEL.—We had no expectation of making a thorough exploration of the island, as several weeks would have been required, but hoped to see sufficient of the ancient remains to determine for ourselves their character and relation to existing ruins on the mainland. It is evident from the large masses of shapeless debris in the village, and especially near the ruin of the old Catholic church, that the ancient structures were of somewhat greater importance than those seen on the islands to the north, but nothing very definite was to be learned from them. About one mile north of the village and a few hundred yards back from the shore we found the ruins of two considerable structures, one a pyramidal mass some sixty feet long by forty feet wide and twenty-five feet high, with traces of a temple on the summit, and a minute, nearly obliterated chamber with small doorway of the usual character, near the base at one end. The other is a little farther on and proved to be of very great interest, though in an advanced state of ruin. The ready-cut stone of these buildings is so much more easily utilized for fences and building purposes by the present residents than is the rock in place—though the limestones are all soft and easily quarried along the natural exposures everywhere occurring—that it is surprising to find even these remnants left.

The terrace on which the temple stands is four or five feet high,

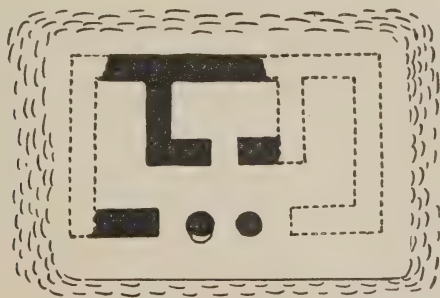


FIG. 17. GROUND PLAN OF SMALL TEMPLE AT SAN MIGUEL.

The sculptured column is at the left of the doorway.

twenty feet in length from north to south, and, as nearly as can be ascertained by present exposures, about twenty feet wide. The fac-

ing has been of hewn, or partially hewn stone, somewhat irregular in form but well laid in mortar. No trace of a stairway is visible. The temple was perhaps not over sixteen feet square, and contained an outer room or corridor ten feet in length by four in width, and two small chambers back of it, one of which was five by seven feet in horizontal dimensions—see Fig. 17. The full height of the rooms was little more than six feet; the walls are nearly two feet thick and the arches as usual are formed by the gradually approaching side-walls, held together at the top by slabs of stone forming a narrow ceiling. Small portions of the roof, constructed of stone and covered with cement, still remain.

The distinguishing feature of this little temple is a remarkable column which has sculptured upon its front the large, ape-visaged figure shown in Pl. IV. This column, and another plain one at the right, divide the wide entrance to the corridor into three nearly equal openings. The sculptured figure is much weather-beaten, and apparently battered, especially about the head and face, and seems rather to have been intended for a human creature than an ape. It is represented in bold relief, or practically in the round, resting on its knees and pressing against or supporting with its back the front of the column. The hands are held in front, apparently grasping the folds of a garment. So far as I can see, no particular significance can be attached to the position. The figure is that of a female, and is possibly the only remaining representative, so far as discovered, of the idolatrous sculptures so generally cast out of the temples by the Spaniards. The figure, column and capital are all in one piece which is of the ordinary porous limestone. Originally the surface was covered with plaster and paint. In parts protected from the weather as many as six successive layers of plaster are seen, each application in turn having received a coat of red, blue or green paint, which would seem to indicate a somewhat long-continued occupancy of the building. Encircling the front of the column over the sculptured head are painted or imprinted four red hands, a feature occurring with considerable frequency in the ancient Maya structures. The lintel stones, two of which remain in place, are large and evenly cut on the exposed sides, and these and all the walls have been finished, as was the sculptured column, in plaster and washes of color.

RUINS OF CEDRAL. From the harbor of San Miguel we sailed fifteen miles down the west coast of the island and landed at a native dwelling, from which a charming walk through the forest brought us to a small village known as Cedral, three miles inland.

PL. IV. PORTAL OF A SMALL TEMPLE, ISLAND OF COZUMEL.

This building was not more than 20 feet square and 10 or 12 feet in height, and rested on a squarish terrace about 5 feet high. The portal was 4 feet 6 inches in height, and about 14 feet in width, and was divided by two round columns, one of which is plain while the other is sculptured to represent a kneeling figure, the face being much battered. Over the head are imprints of the red hand.

The stone lintels are in place, though the cap is lost from the plain column, leaving one of them only partially supported. Portions of the moldings, walls and roof remain. Photograph by E. H. Thompson.



PORTAL OF A SMALL TEMPLE, ISLAND OF COZUMEL.

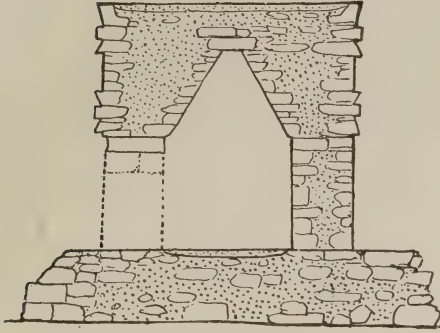


FIG. 18. SECTION OF SMALL BUILDING NEAR THE VILLAGE OF CEDRAL,
COZUMEL ISLAND.

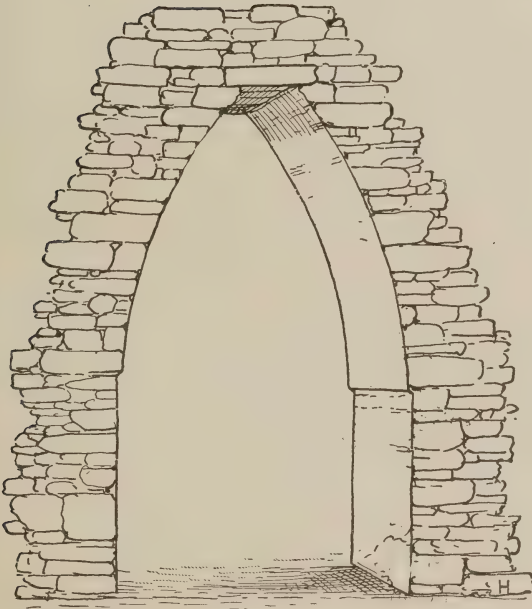


FIG. 19. ARCHWAY IN QUADRANGULAR RUIN IN THE VILLAGE OF CEDRAL,
COZUMEL ISLAND.

Here two fairly well-preserved structures were encountered, while others, almost wholly destroyed by modern builders, were traceable, thus indicating an ancient occupancy of more than usual importance. In the center of the village is a small temple resembling somewhat that on Mugeris island, already described. It occupies the margin of an ancient terrace some five feet high, one hundred feet long on the front and considerably less in width. Beside it on the other margin of the terrace is the village church, a most crude, barn-like affair constructed, as are the dwellings of the people, largely of poles set on end and bound together by withes, the roof being thatched with leaves; its flimsy character is in strange contrast with the massive construction of the pre-historic temple. The ground plan of the ruin shows two oblong chambers, each about four feet six inches in width, sixteen feet in length and ten feet high. The front room is entered by a centrally placed outer doorway, now much broken down, while the inner room is reached by a second doorway directly behind the first. The interior walls are six feet high to the spring of the arch, and above this the opposite sides approach each other, reaching the ceiling stones some four feet higher. The inner door is four feet six inches high by two feet wide. The lintel stone, six inches thick and three feet long, is set back a few inches, leaving a shallow depression in the front which was plastered and is said, by the oldest inhabitant of the village, to have been covered with painted figures or glyphs. The exterior walls and roof are for the most part well preserved, and the whole construction is uniform in character with other buildings of its class.

A similar structure containing but one chamber is found about a quarter of a mile from the village. Near it and on the same broken-down terrace, which is perhaps 35 by 45 feet in horizontal dimensions and 4 feet high, are the foundations of another similar building. The standing temple or house is only 10 by 15 feet in dimensions and the single room is about 5 by 9 feet. The door, walls and arch are as usual. The section, Fig. 18, extending from front to back, indicates approximately the construction. The rather roughly laid exterior walls were plastered, and the surface varied by two bands of molding, the lower 5 feet from the ground and the upper at the top, the whole height being 10 or 11 feet.

That these pigmy buildings do not fairly and fully represent the achievements of the ancient people of Cozumel is amply proved by the remains of a group of structures encountered in the southern* margin of the village. Here we have traces of probably four buildings arranged about a court some 100 feet square. Most of the

*It is possible that the orientations here given are confused.

walls have been robbed of their facings of cut stone and only ridges of debris remain, but the fine arch shown in Fig. 19 is left, and another of like form is represented by a mere skeleton held together by matted roots of trees, the outline of the arch appearing in wood rather than in stone. The village quarrymen had but recently been at work. This latter arch is on the east side of the quadrangle, near the north end, and connects on the south with a ruined mass in which a number of round columns appear. The relation of the columns to the building cannot be determined. They are from 18 to 24 inches in diameter and stand about 7 feet apart, none being above 4 feet in height. At the northeast corner of the quadrangle and separated from it by a few feet is a ridge of debris 6 feet high by 20 feet wide and about 60 feet long, which extends to the northeast. It may represent a structure originally connected with other more completely reduced buildings encountered in this part of the village. This ridge is now being used as a stone quarry by the inhabitants.

The better preserved arch, illustrated in Fig. 19, opens through the northern tier of buildings near the west corner. It is 10 feet high to the capstones, 6 feet wide and 8 feet 10 inches through from outer to inner face. It is built largely of uncut stones and has been carefully plastered and painted. Little remains of the walls or buildings forming the southern and western sides of the quadrangle. In the court a little north of the center is a pile of debris some 4 feet high and 20 feet in diameter which, no doubt, represents a small temple or shrine. It is worthy of observation that this group of structures exhibits in general the ground plan so often seen in the more western states of Mexico.

RUINS OF EL MECO.

January 2nd was set apart for a visit to the mainland of Yucatan. The trip was about five miles across the bay to the southwest from the village of Dolores, Mugeris Island, and was made in the handy little gasoline launch. The morning's experience was rendered especially charming by the beautiful sea, which outdid itself in its marvelous transparency and display of brilliant colors. Approaching the land obliquely little was seen to break the monotony of the low-lying shore save a large clump of foliage, rising above the even forest line and marking the site of a considerable group of ruins called El Meco. Landing on a low, sandy point a little above the ruins we skirted the shore for a short distance, encountering the remains of small stone structures partly buried in the sand. Passing over the sand ridge which borders the shore, we descended into a basin-like

enclosure formerly occupied by a small lagoon, and following a slight path for one hundred yards reached the forest-covered buildings.

The central and principal structure is an imposing pyramidal pile almost wholly hidden in verdure. From the tottering walls of the summit a superb view is obtained of the iridescent waters of the bay and the islands to the east, as well as of the forest-covered plains to the west, but no glimpse could be obtained of the numerous ruins that surround the pyramid lying close to its base. This structure was so much dilapidated, and so obscured by clinging vines, that it took some time to secure a clear notion of its character. It is a stepped pyramid, about sixty feet square at the base, not including the small building at the southeast corner, and about forty feet high. It supports upon its truncated summit, which is some thirty-six by forty feet in extent, a temple fourteen feet in height and about twenty-two by thirty feet in horizontal dimensions. The temple stands back from the east margin, leaving an esplanade or terrace twelve feet wide in front, while on the other sides the projection is not nearly so great. A steep stairway ascends to the broad, eastern terrace. The temple is in an advanced state of ruin on the east front, but the side and back walls are nearly entire. The entrance was about eighteen feet wide and was divided into three openings by two round columns, now reduced to less than one half their original height. These are seen in the illustration, Fig. 20, a view of the pyramid showing it about as it would appear from the northeast with the vegetation removed. The interior is filled in to a considerable height by the debris of fallen roof and walls, so that the plan is not readily made out, but there was evidently a corridor in front, extending the full length of the building and a smaller chamber behind, entered by a door near the middle, shown in the plan, Fig. 21. Portions of the arched roof are still in place and remnants in the back room indicate a depressed, somewhat unsymmetrical, ceiling. The outer walls are separated at the corners and threaten to fall outward at an early date. They are about ten feet high above the base of the columns and retain portions of the cornice moldings, which seem to differ from the usual type in having but two members instead of three, the upper triangular member being absent, as seen in Fig. 22.

As will be seen by reference to the illustration, Fig. 20, the structure as a whole is rather clumsy and unsatisfactory in its lines and proportions. The series of monotonous terraces will be better appreciated, however, when it is observed that they were probably not a feature of the original structure, but added later for the purpose of strengthening the vertical walls of the building. A broad projection extends all around the base of the temple proper. The

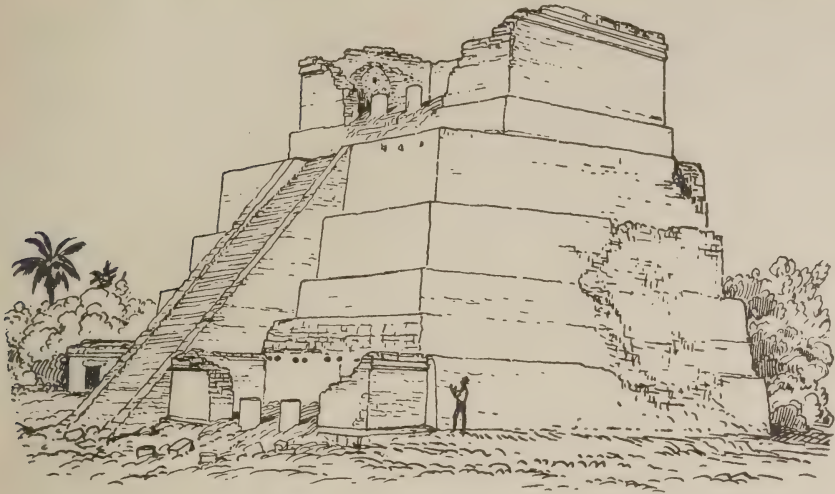


FIG. 20. PYRAMID-TEMPLE WITH TWO INFERIOR STRUCTURES AT BASE.
El Meco, mainland of Yucatan opposite Mugeris Island.

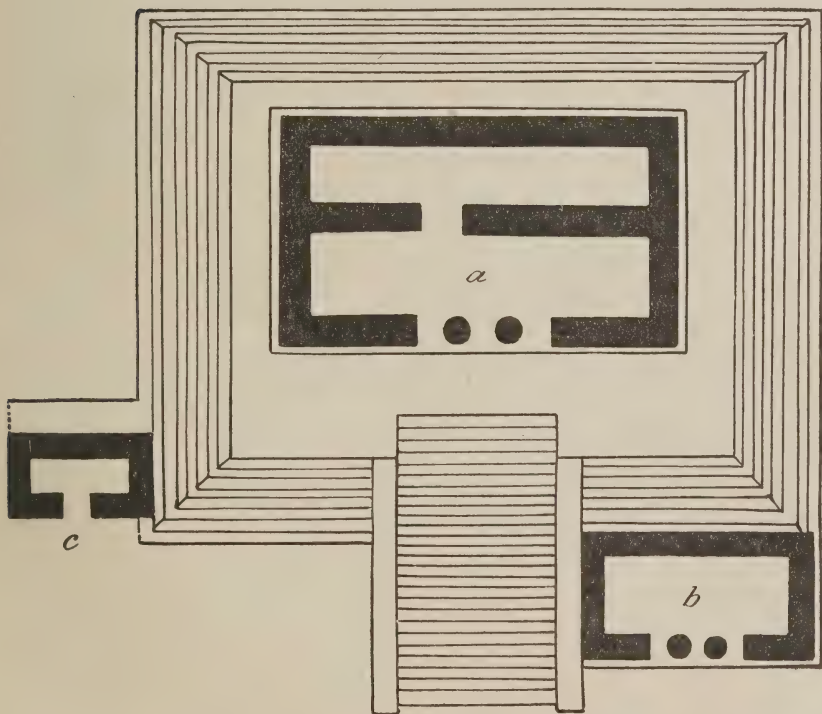


FIG. 21. PLAN OF PYRAMID-TEMPLE, EL MECO, MAINLAND OF YUCATAN.

- a.* Main, summit temple.
- b.* Lower temple.
- c.* Minute one-room building

exposures made by the falling away of the enclosing terraces at the northwest corner, indicate that this projection was probably the coping or upper member of the frieze of the substructure and that beneath are the other moldings and the wall extending down toward

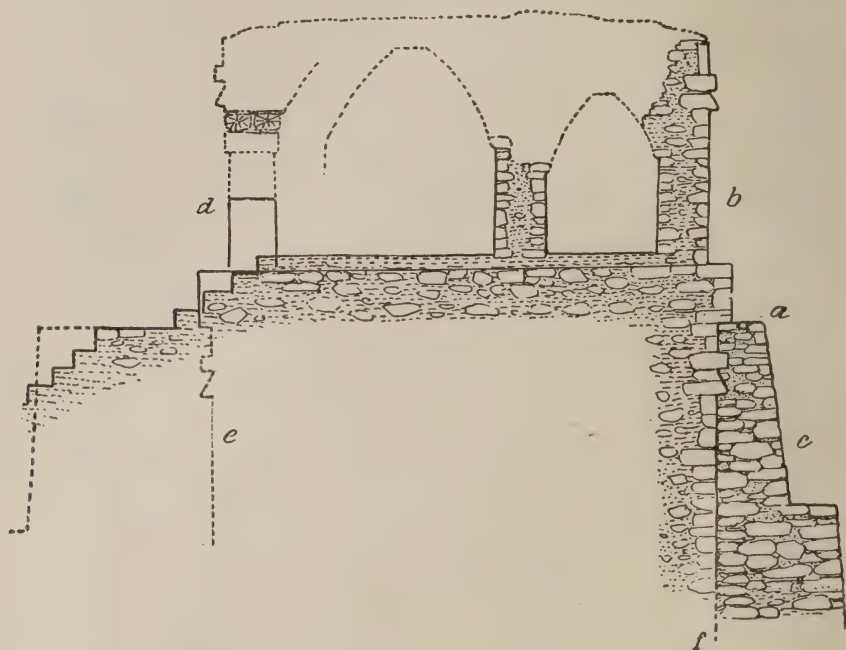


FIG 22. SECTION OF SUMMIT TEMPLE, PYRAMID OF EL MECO.

- a.-c.* Terraces of abutting masonry.
- b.-f.* Vertical wall of original structure with usual moldings.
- d.* Column at doorway of temple; cap and lintels restored.
- e.* Probable profile of original structure, eastern wall.

and possibly to the ground level. The abutting terraces were so built that the projection at *a* rested upon the upper surface of the highest terrace, thus adding to the firmness of the superstructure. The position of the opposite profile, *e*, is of course conjectural.

The casing of terraces extends entirely around the structure, save the space occupied by the stairway on the east side, and rises from the ground in four steps, the lower being about five feet high and the others about seven feet each. The terraces vary from one to two or three feet in width. The outer faces incline inward a few degrees as they ascend and are quite uneven. The masonry is crude and the stones are to a large extent unhewn and uneven, but the surface has received a coat of plaster, most of which is now removed. The stairway rises at an angle of about forty-five degrees, and the rises, and consequently the treads, are very narrow. The width is about twenty

feet and the length with the slope some thirty feet. It does not rise to the outer margin of the upper terrace, but is set into it so that the upper rise reaches the surface a few feet back of the front. A little back of this landing three or four steps, omitted in the plan, lead up between the columns into the temple corridor, an arrangement not uncommon in Eastern Yucatan.

A somewhat interesting feature of the pyramid is a temple, resembling that upon the summit, built against the base between the stairway and the northeast corner. As seen in the drawing, Fig. 20, there are two columns at the entrance, as in the summit temple; there is, however, but a single apartment, which is twenty feet long by seven feet wide. Portions of the roof masonry remain at the back, and beneath is seen a row of beam or joice holes, arranged in seven pairs; the use of the beams, if the ceiling were arched, cannot readily be made out. The probabilities are that the roof was flat and supported by seven pairs of joice timbers, as there are no traces of an arch against the stairway wall at the south end. The chamber is about six feet in height to the beam sockets. There was the usual frieze outside and the walls were neatly plastered and finished with a pale, salmon-colored paint, well preserved over the greater part of the surface.

At the southeast corner of the pyramid is a building, set back a few feet from the front, which is so minute as to have been used to confirm the myth of a pigmy people. It is thirteen feet long by eight feet wide outside and has one end set against the base of the pyramid. The doorway enters from the front and is three feet high by two feet three inches wide. The roof is still entire and the full height of the structure is a little less than seven feet. It is largely built of cut stone and was finished with the usual frieze moldings. The roof is composed of a thick coat of very hard cement, which is broken down considerably at the edges. The use of this minute apartment must remain a matter of speculation. It may have been a lodge for priest or guard, a storehouse for temple properties or supplies, or possibly a tomb, many such minute chambers having been used for the latter purpose in the pyramidal bases of temples in other parts of Mexico.

A hasty examination of the ruins which surround the pyramid indicates the existence of a partially enclosed court with the pyramid in the center. Possibly there has never been a building on the north side facing the marsh, but on the west and east sides there have been long buildings with heavy walls and rows of round columns which still stand in many cases to their full height—some six or seven feet. These columns doubtless supported the roofs of the buildings which were, in places at least, thatched, as there is not enough debris to indicate the existence of stone arches. On the south side there are a number of ruins, mostly of similar character but apparently not

symmetrically arranged, serving to enclose the court somewhat completely on that side. In front of the pyramid and twenty feet from the base of the stairway is the ruin of a small temple or shrine, like those seen on the islands, approached from the east and west by steps four or five in number. At the southeast angle of the court, and connected with the main eastern ruin, is the base of a temple with several rooms, and a stairway the sides of which were finished with serpent balustrades, the large heads resting on the ground as in some better known Yucatec examples. We were informed that other ruins are scattered through the forest, indicating a settlement of importance, but there was no time to search for them. This ruin was visited by the Le Plongeons a few years ago, but nothing has been published, so far as I have learned, save a mere mention in "Here and There in Yucatan," by Mrs. Le Plangeon.

In character and appearance El Meco does not seem to differ essentially from many similar ruins in Yucatan. The builders were doubtless one of the numerous Maya tribes that occupied the peninsula on the arrival of the Spaniards. It is remarked, however, that the buildings seem to have been of rather inferior size, construction and finish, as if the materials were less easily utilized and worked than in other places, or that the people were inferior or provincial, living beyond the immediate influence of the great culture centers. It may be noted that the front of the temple faces east, and that from the head of the stairway the little temple on the southern end of Mugeris island is distinctly in view. The stone used in construction was probably obtained from the immediate vicinity, and was very largely of uncut masses and fragments set in mortar and evened up by plastering. Considerable cut stone was used in cornices, corners of walls, door facings, lintels, stairways, and especially in the numerous round columns. These latter were often composed of a single piece twenty to twenty-four inches in diameter and six or seven feet in length. Their presence implies rather extensive quarrying of the limestone in place, as loose masses of surface rock of large size must have been rather rare along this low-lying shore. A few other ruins of considerable importance are reported along the eastern shore, and others are scattered over the interior regions, but no group of remains of first-class importance has been reported in the north-eastern angle of the peninsula.

RUINS OF TULOOM.

The most important group of ruins on the east coast of Yucatan, so far as the remains have been reported, is that known as Tuloom. It is situated on a high bluff overlooking the sea, some twenty-five miles southwest of San Miguel, the main settlement of the island of Cozumel. It was visited by Stephens in 1840, and he has given us the only available account* published up to date. This place must have been an important stronghold of the ancient Maya⁴, although it was not visited by the early Spaniards so far as our records show. It is a remarkable circumstance that this place is held to-day by a Maya tribe which has never been permanently subdued by the Spaniards or Mexicans, and which now holds it as an outpost, being at war with the Mexican Government and with all intruders whatsoever their nationality. At the time of our visit to Cozumel there were special symptoms of hostility, and the sub-chief, to whom the Tuloom district was intrusted by the principal chief, whose headquarters are some distance inland, had recently been summarily executed for permitting trade between his people and the inhabitants of Cozumel. It was natural, therefore, when the leading citizen of Cozumel, Don Pedro Perez, assured us that we would certainly be fired upon by the hostiles if we attempted to land, that the project of studying this ruin was abandoned. As the sail across the bay from the southern point of Cozumel, where we had work to do, was such a short one, we decided to take a look at the ruin from the sea, and were well repaid for the few hours consumed in the trip. The accompanying sketch, Fig. 23, made from the deck of the *Ituna*, will give a somewhat vivid idea of the remarkable ruin and its novel and picturesque situation.

As we sailed to the southward, keeping as near the shore as the depth of the water would permit, the low line of bluffs increased in boldness and we soon came in sight of a series of somewhat isolated ruins whose light-colored walls were clearly defined against the dark-green forest of the seaward slopes. At the left was Tuloom, Fig. 23. The promontory on which it stands comes well forward into the sea. Rising to a height, in places, of perhaps one hundred feet, is an irregular bluff deeply scarified and undercut by the sea. In other places it is lower, and to the north and south it disappears. The rock seems to be the same massive, brownish, porous limestone, encountered elsewhere along this coast, and breaks down in great irregular masses which lie at the base of the cliff until eaten up by the waves. From the crest of the cliff a steep, wooded slope reaches back and up one hundred feet or more to the upland. Midway in this slope and partly

* Stephens' *Incidents of Travel in Yucatan*, Vol. I, p. 390.

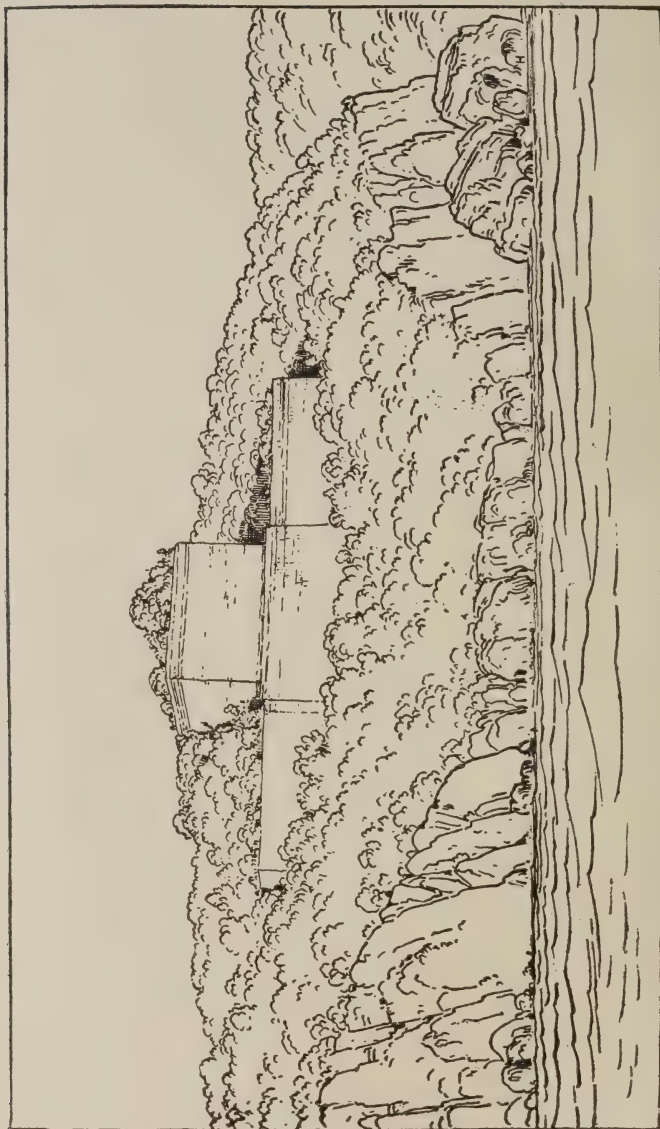


FIG. 23. RUINS OF TULOOM AS SEEN FROM THE SEA.
The building fronts inland and the outer walls are without doors or windows.



FIG. 24. PANORAMA OF TULOOM AND THE SHORE TO THE NORTH. SKETCHED FROM THE YACHT.

buried in the forest is the main ruin of Tuloom. The building faces inward and the broad outer walls, which are all that can be seen from the water, are extremely monotonous, being without doors or windows, and without decoration save perhaps the cornice moldings, which were, however, not clearly made out. The central building appears to have two stories, the lower having wings of equal height projecting at the right and left. The central structure is squarish in form and well preserved, and is crowned by a pyramid of vegetation which flourishes upon the roof. This is the temple described and illustrated by Stephens. We were extremely loth to turn our backs upon these monuments without a closer view, for they evidently represent the most important Maya city east of Chichen-Itza. Occupying corresponding, though less prominent situations in the face of the seaward slopes, are three other ruins, apparently all important structures, one appearing upon the bluff next north of Tuloom, and the other two, rather close together, a mile or more up the shore.



A MUGERES COLUMN, ISLAND OF COZUMEL.

RUINS OF MIDDLE NORTHERN YUCATAN.

MOUNDS AT PROGRESO.

The geological history of Yucatan has been but little studied. The exposed formations are all of comparatively recent age as indicated by the fossil remains which represent mainly late pliocene or early pleistocene forms, many species being identical with those now living along the shores. The physical characters of the surface are peculiar and serve also to indicate a recent elevation of the land area above the sea level. The northern margin of the peninsula is very low, the strata sloping at a gentle angle to the north and passing gradually beneath the sea. The coasts consequently exhibit few outcrops of the rock, and are bordered by sand-bars enclosing narrow, marginal lagoons. At Progreso the lagoon is a salt marsh, now gradually filling up, so that the space will soon be permanently added to the land area. The face of the country is composed of rough-surfaced beds of limestone only partly covered with soil, and at Merida, twenty-five miles inland, the elevation is only twenty-five or thirty feet above the sea.

Progreso is built on a sand bar rising ten or twelve feet above high tide. The spot appears to have been extensively occupied by the ancient peoples, and a number of low mounds composed of midden refuse and the debris of habitations are still to be seen about the outskirts of the village. Just back of the railway station and on the edge of the marsh are two of these mounds, each several hundred feet in horizontal extent and rising to a height of five or six feet. They are composed largely of dark earth, which is filled with countless sea shells—the kitchen refuse of a community that must have subsisted very largely upon the products of the sea. There are also great quantities of earthenware displaying all the varieties of material, shape and decoration characterizing the ancient Maya work. There are stone implements as well, which include hammerstones, sledges and objects of flaked flint and limestone.

Just beyond the western limits of the village of Progreso there are other mounds of like character and contents, and, indeed, it may be said that such occur all along the northern shores of Yucatan. Not only are the coast lines supplied with these and analogous re-

mains, but the whole surface of the country is dotted with mounds and pyramids, many of which are visible in the fields from railway trains and roads. A few only have been visited by students, while thousands of others, hardly inferior in interest, have been passed by and remain today untouched save by the plow, the quarryman's sledge or the pick of the treasure hunter.

The capital of Yucatan, Merida, is situated on the site of the ancient city of Tiho, and there may still be seen one great mound and a number of low ones that represent ancient pyramids and temples. It is interesting to note that the dwelling of our archeologist associate, Mr. Thompson, is located upon one of these tumuli.

UXMAL.

From Merida the trip to Uxmal is made by rail south to Tikul thirty-five miles, and thence by *volan coche* over rocky plains and across a low range of limestone hills twenty miles to the westward. It may seem incomprehensible that a student of American antiquities should limit his visit to one of the grandest groups of remains on the continent to a single day. Having made a long and in large part a disagreeable journey, it was indeed hard to have to return after taking a mere glance at the wonderful structures, but it was considered dangerous on account of the deadly miasma of the locality to remain long at the hacienda. Few strangers have the temerity to make a prolonged visit, and our companion, Mr. Thompson, having spent a few weeks here preparing models for the Chicago Exposition, knew by painful experience the dire results. Strangers are, of course, especially subject to the febrile influences, but so deadly are the poisons that it is said no child born on the hacienda has ever survived to grow up there.

The time spent at this place by our party was, therefore, not sufficient to permit more than a most superficial examination of the extensive remains, but many sketches and photographs were obtained. Descriptions already in print are more detailed than I can undertake to give, and it seems that the only way in which I can add materially to the body of published data relating to the ruined city, is to prepare a panoramic sketch and accompany it with brief descriptions, thus presenting in a single view all the important features of the site, and furnishing a key to the ruins easily utilized and sufficiently detailed for the ordinary reader or even for the student who desires to acquire quickly a comprehensive idea of the group.

The country is for the most part a great forest covered plain, and the horizon is everywhere as level as the sea, save where broken on the east by a range of hills crossed on our way from Tikul and not seen in the sketch. Like the most of northern Yucatan, this locality has some of the characters of a desert, for there are no streams or springs. In ancient times the water supply was furnished by cisterns within the city, or by pools of water some distance to the west, which are now filled up, save in the wet season, with soil and vegetation, and give forth the death-dealing poisons for which the district is notorious.

The area covered by the main group of ruins is not large, probably not much more than half a mile square, but scattered remains are found beyond this limit, and the place when inhabited must have been extensive and important, and no doubt presented a brilliant and imposing effect. Though the buildings are now much dismantled and buried in deep forest save where recent clearings have been made, they are still impressive in the extreme, and it is difficult to realize that the huge pyramidal masses, rising like hills above the general level, are really wholly artificial. It is believed by some that Uxmal is the most important ruined city in Yucatan, but it has a great rival in Chichen-Itza, and it may not have surpassed in grandeur several other cities not now in an equal state of preservation.

There are five great structures or groups of structures that take high rank as specimens of Maya architecture. These are the Pyramid-temple of the Magician, the quadrangle called the Nunnery, the House of the Turtles, the House of the Pigeons and the Governor's Palace. They are surrounded by as many more, less in interest and importance only because they are in a more advanced stage of ruin. In order to present a clear and comprehensive panorama, the point of view assumed is considerably above and to the north of the quadrangle of the nuns. This point is at X on the accompanying map which is placed with the south at the top to make it accord better in position with the panorama. This map is based largely on that of Stephens and is far from satisfactory, but it will serve to give an idea of the eccentric placing of the buildings and their relative dimensions, as well as to show some details of their ground plans. In the drawing the spectator is facing the south and has the hacienda at his back nearly a mile away; the timber has as far as possible been omitted. Great detail is not attempted as photographic illustrations of individual structures must be relied upon for special studies, but a good general notion of the group is, I believe, secured. Few measurements were taken, and those given, derived from various sources, cannot as a rule assume to be more than approximations, but they serve

general descriptive purposes quite well. It is seen at a glance that the buildings are irregularly placed, none of them being exactly orientated, and few stand in identical relations with the points of the compass.

In the foreground at the left is the Pyramid-temple of the Magician, **A**, with its small court at the right hand base. Connecting immediately with this is the Nunnery quadrangle, **B**, occupying the greater part of the foreground. Behind the latter, on the ground level, are two massive ruined walls usually referred to as the Gymnasium, **C**, and rising behind this is a great triple terrace, on the second level of which, at the right, is the House of the Turtles, **D**, and crowning the summit is the Governor's Palace, **E**. To the right and beyond is the serrated crest of the House of the Pigeons, **F**, overshadowed on the left by the massive pyramid, **G**, and backed up by a temple-crowned pyramidal pile of inferior dimensions, **H**. To the left of the House of the Governor and beyond is a group consisting of two pyramids, **I**, and on the right of the Nunnery quadrangle, and some distance farther away, are other ruined masses, one only coming fully within the limits of the picture.

Certain features of material, construction, plan, elevation and ornament are common to all, or nearly all, of the buildings, and these may be reviewed at the outset and largely omitted in the descriptions of particular buildings. The stone used is the pale yellowish and reddish-gray, obscurely marbled limestone of the locality, and was extensively quarried from the massive beds somewhere in the vicinity, the sites, buried in the dense jungles and obscured by debris, being necessarily hard to find. No one has undertaken to locate these quarries which will, no doubt, be found to exhibit all the usual phenomena of stone-age manipulation. The body or hearting of the walls and mounds is constructed of fragmental stone set in a liberal matrix of whitish mortar of excellent quality, made of lime burned in the vicinity. The facings and ornaments are all cut and sculptured with a masterly handling not surpassed where chisels, picks and hammers of iron and steel are used, and the faces and contact margins are hewn with perfect precision. Though the finish of the surfaces was often secured by means of abrasion or grinding, picking or pecking were the main agencies employed, and the indents of the tool are often apparent and wonderfully fresh looking. The stones were set in mortar, although in many cases the joints are so perfect that the mortar does not appear on the surface.

The sections presented in Figs. 25 and 26 indicate the average construction. Much plastering was done and nearly all surfaces, and apparently even the multiferous details of moldings and sculptures,

were evened up with white plaster in the most painstaking manner and finished in colors of several hues. The walls are thick, averaging perhaps three feet, but extend in one case to nine feet, and are approximately vertical on the exterior to the full height, and on the interior to the spring of the arch. Outer faces are little broken by recesses and projections, and are only saved from monotony by their elaborate ornamentation. Usually they are divided nearly midway, by rigid moldings of prevailing type, into an upper and a lower zone, the latter being almost always faced with plain cut stone, save a narrow band of ornament at the base, and the former—a development of the entablature—is elaborately decorated with composite sculptures, and bordered above by the usual heavy band of moldings.

The course of shoe-shaped coping stones served in all cases to retain the level, cement floor of the roof. The corners of the buildings are square or rounded. There are no windows or other openings for air or light. The doorways are confined to the lower or plain zone of the wall space and are simple in construction and finish and of medium or large size. They occur singly, the great portals with columns not being seen in Uxmal. The jambs are faced with cut stone like that of the walls, and the longer lintels are or were of zapote wood dressed square or partially squared, averaging perhaps fifteen inches wide, twelve high and eight feet long. Many are well preserved to-day, especially where protected from the weather, and some were covered with inscriptions.

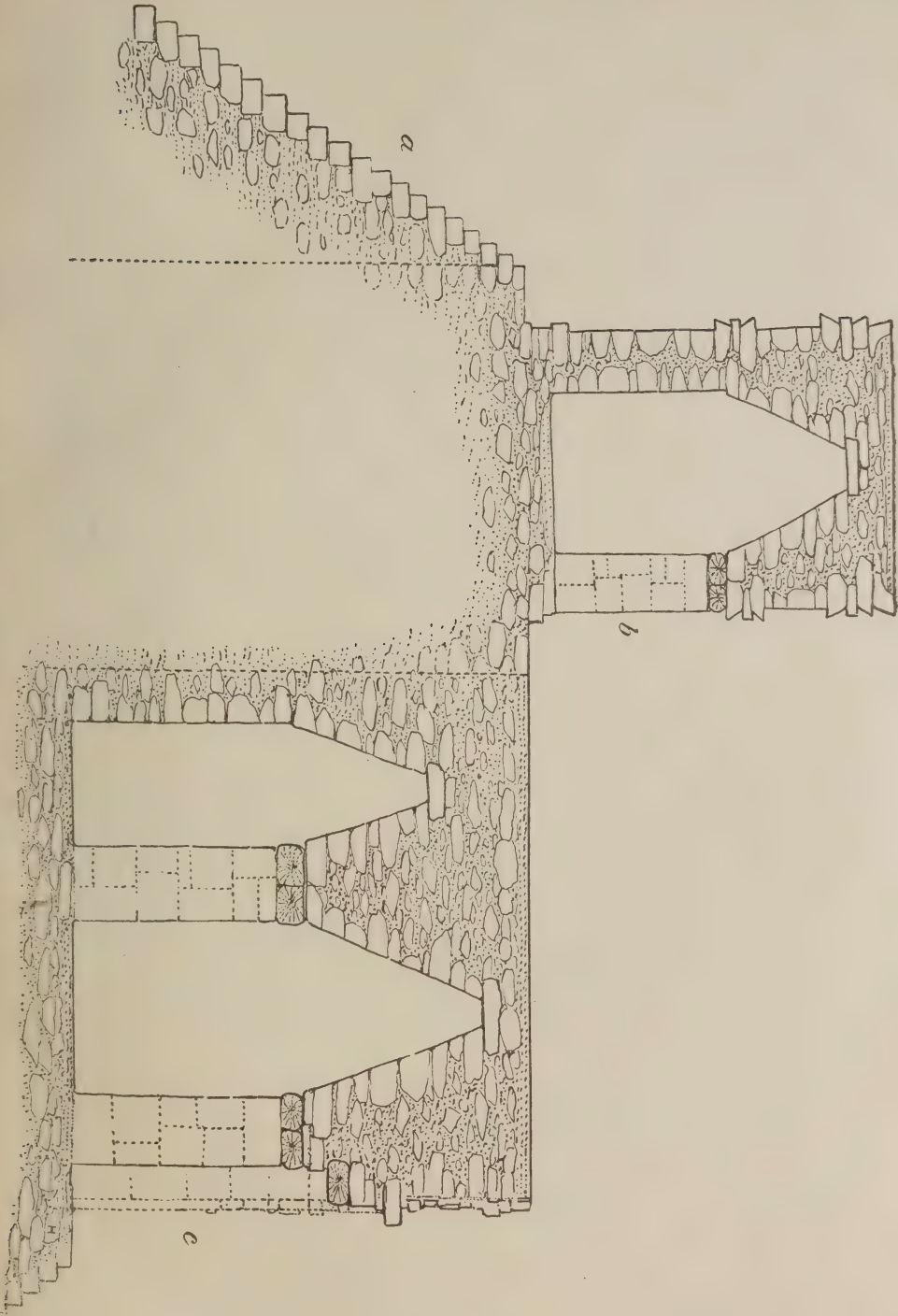
The plan of the buildings usually takes the form of a long, narrow rectangle, having one or two ranges of rooms, generally the latter, and it may be said that, as a rule, there is an assemblage of these structures in groups of four about a court, forming a quadrangle. The squarish temples, with specialized plan, characteristic of Chichen-Itza, are rare or absent. None of the buildings are over one story in height, though the roof crests in some cases give the effect of great elevation. Nearly all are built on terraces or pyramids which assume a great variety of ground plan and profile.

The apartments are all of good size and height, and the vaulted ceilings are formed of the usual wedge-shaped arch constructed of horizontally placed stones corbelled and bevelled with the slope. The capstones, the connecting stones of the vault, are exposed to a width of from twelve to twenty-four inches. The interior walls are without features of interest save numerous beam holes, and dumb-sheave cord-holders for attaching doors or hangings. Stairways were numerous, wide, well built of cut stone, and generally steep. A very common feature of the courts is a standing stone or *picoté*, as the Spanish say, believing them to be whipping posts, and phallic emblems occur in many places.

TEMPLE OF THE MAGICIAN. This temple may well be regarded as amongst the most notable ruins in the group, and is first to catch the eye of the visitor who approaches by the roadway. It stands at the left in the foreground of the panorama, the north end facing the observer. The steep pyramid supports upon its summit a ruined building, and upon the western face, near the top, is a second structure of remarkable position and appearance. The height of the pile is upward of eighty feet, the length at the base about two hundred and forty feet, and the width nearly one hundred and sixty feet. The ends seem to be somewhat rounded, as seen in the plan, a novel feature in structures of this class. The summit platform measures about twenty-two by eighty feet. The interior of the mass is composed of stones of varied shape and size imbedded in coarse mortar, and the surface was faced with rough-dressed stone, large portions of which are still in place. A wide stairway, not in view in the drawing, rises directly from the roadway on the east side at an angle so steep that the ascent is made with difficulty and at no little risk. The steps are constructed of smallish, rather roughly hewn stones, originally well laid in mortar, and probably evened up with mortar, but now much loosened and displaced, though the stairway is, as a whole, still in a wonderful state of preservation considering the steep angle, and the many destructive agencies that have been at work upon it for upward of four hundred years. The platform is narrow and shows vertical faces of hewn stone extending down into the mass of abutting masonry. The temple which crowns the summit is some seventy feet long by twelve feet wide, and contains three rooms, the middle one being longer than the others. The arch-supported roof has fallen in, and the walls are broken down wherever there were doorways. The end wall at the north is completely destroyed, while that at the south end is nearly entire. The east façade, about one-third of which remains, has been comparatively plain, but the west face, seen at the right in the sketch, though broken down in the center, evidently presented a most attractive appearance. Extending around the base of the wall, save for a short distance along the north front, is a band of columnar ornament. Above this is the lower wall-zone, plain at the outer ends, and exhibiting neat and chastely embellished lattice-work panels next the broken-out doorway. The upper space is rather narrow, and is decorated with four panels filled with unique sculptures, the upper member in each being a mask of rare form. The center over-door piece has probably been elaborate and handsome. The medial and cornice moldings are of the usual type. The whole height of the building is about sixteen feet.

The most striking and unique feature of the structure is a temple

FIG. 25. SECTION OF UPPER AND LOWER TEMPLES, HOUSE OF THE MAGICIAN, UXMAL.



built against the north side of the pyramid, and having its roof on a level with the crest of the pyramid. The doorway opens on a narrow platform from which a stairway, some twenty-four feet wide, the body of which still remains, descended into the court below. The façade of this temple is about twenty-two feet square and is a most ornate and vigorous piece of composite sculpture. The large space above the doorway is occupied by a colossal snouted face or mask some twelve feet square, worked out in a wonderful manner and filled with striking and unusual details, the principal of which—probably a life-size statue standing on the snout and resting against the forehead—is lost; others are a pair of tigers, placed together with outward turned heads, supporting the pedestal of the statue, and groups of devices, resembling glyphs, forming the cheeks of the mask. The corner decorations comprise smaller masks, seven in each tier, built up, as in other cases, of numerous sculptured stones, and the sides connecting the façade with the sloping face of the pyramid are also elaborately treated. The exterior wall surfaces of this temple is thus entirely covered with these ornaments—a rather unique occurrence in Maya architecture. The interior is entered through a doorway of noble dimensions and style, and consists of two plain, oblong chambers, one behind the other, arched as usual. Pilasters are placed at the sides of the doorway, and the lintel consists of three strong beams of zapote wood. The accompanying section, Fig. 25, will assist in understanding the construction of these and other features of the monument.*

The nature and construction of the lower slope of the pyramid on the west side were not made out. The stairway may have been interrupted by other buildings, but this is unlikely. Low down on the slope are the remains of several small chambers which may have served as tombs. The rather small court occupies the space between the base of the pyramid and the eastern wall of the Nunnery Quadrangle, and though not very well defined, appears to have been enclosed by buildings somewhat as in the well-preserved quadrangles. The House of the Birds, described and illustrated by Stephens, is in this cluster.

NUNNERY QUADRANGLE. This famous group of buildings is among the best known specimens of Maya architecture, but much as it has been described, and as fully as it has been illustrated by the drawings of Catherwood, the photographs of Charnay and Le Plongeon, and the photographs and casts of Thompson, the student must see it before he can begin to realize its marvels. Four great rectangular struct-

*This section was made out from hasty observations and is probably defective in details. The upper doorway is restored. The long dotted lines are intended to indicate probable vertical wall faces.

ures, low, heavy, and formal in general conformation, stand upon a broad terrace in quadrangular arrangement, their ornate fronts facing inward upon the inclosed court. This assemblage of massive structures of stone presents at first glance the appearance of a fortification, but closer examination does not bear out the impression. The buildings stand apart at the corners, leaving wide passageways into the court, and though three of them present unbroken exterior walls, the fourth, on the south side, has exterior doorways, and a grand archway, ten feet wide and fifteen feet high, leading through the center of the building to the court, as seen in the panorama. The defensive motive seems to have had no part in the design, and we have merely a convenient assemblage of four independent buildings, intended for a common use or for kindred purposes. Though built, no doubt, at somewhat different periods of time, they are much alike in plan, construction and general effect. They do not have the character of temples but rather of communal dwellings or residences for bodies of priestly or other sacerdotal orders.

In the panoramic sketch we look down upon the great quadrangle from the north, the exterior wall (of which few details were secured) and the broken roof of the north building appearing in the immediate foreground. The serrate crest, at the farther side of this mass, is a back view of the lofty, highly ornate, though much broken façade. At the left is the east building with its flat roof and its fine façade much foreshortened. Beyond we see the inner front of the south building with its dark archway, and to the right is sketched in the wonderful entwined feathered-serpent façade of the west building.

The terrace upon which these buildings are somewhat unsymmetrically placed has not been very clearly defined. The base measures upwards of 300 feet square; on the south it rises in three unequal steps to a height of perhaps fifteen feet; on the other sides, and especially at the north, the height is considerably greater. The plans of the four buildings are rather imperfectly indicated on the accompanying map, and two small structures, much ruined, appear within the court near the north side. Between the latter a wide stairway ascends to the esplanade of the north building. The state of preservation of the buildings is pretty well shown in the panorama.

The four great façades facing the court are among the most notable in Yucatan, and deserve especial attention at the hands of students of American art. They have been carefully described by several authors, however, and require but brief mention here. Bancroft's descriptions are especially full and lucid. Though presenting a somewhat varied appearance, these buildings are essentially alike in plan, elevation and construction. The differences are mainly in the

decorative treatment, though even in this respect they have many characters and features in common. In all cases the lower wall-zone is plain and the upper almost wholly covered with sculptures. In the south and west buildings the façades appear to have terminated above with the coping. The east building shows the remnant of a center-piece that rose slightly above the cornice, and the north façade had an elaborate false front covered with sculpture and rising in a dozen or more pinnacles or gables of varying height.*

Examining the various motives employed in embellishment we find that the great snouted mask† was the favorite and is found in all the fronts. It differs in each case, however, and reaches extraordinary elaboration of detail in the north building, where it formed vertical tiers five or six faces deep at the corners and over alternate doorways, rising in each case to the crest of a façade pinnacle. The mask was also used in inferior pinnacles rising from the coping over the remaining doorways.

In the east building there are vertical tiers of similar faces at each corner, and one corresponding line in the middle of the front. One column of three superposed masks is preserved in the west building. Toward the left there were probably two others, the middle one possibly having superior height and prominence. The corners were no doubt ornamented in like manner. The south façade has masks, of somewhat different detail, associated with the coping over each doorway, as indicated in the panorama.

Next to the mask design the most important motive is the serpent, which appears in the east, west and north fronts. The embodiment of the colossal feathered serpent with the complex field of geometric decoration in the west façade is a most effective piece of work and must be regarded as a great masterpiece of decorative sculpture. Early explorers state that they found the façade almost complete, but nothing is said about the number of serpents included. Judging by the pretty general consistency of native design, I should incline to question the view taken by Bancroft, that the serpents inclosing the right and left panels—portions of which are still in place—are intertwined with endless serpent bodies inclosing the center panels. We should rather expect to find that there had been two pairs of serpents, the inner member of each pair facing some important, symbolic centerpiece occupying the middle of the façade. This would properly fill the spaces of the building and give consistency to the design. The “nearly intact” of the first observers may leave room for a considerable gap in the façade.

*Charnay, *Ancient Cities of the New World*, p. 400.

†I have usually spoken of these snouted visages as masks. If not masks, they are at least partially masked faces, and probably symbolize the chief Yucatec deity, Cukulcan.

In the front of the eastern building four over-door V-shaped trophy-like ornaments are seen, each consisting of eight horizontally placed, two-headed serpents with bar-like bodies, and against these are set in each case near the top a colossal human head with peculiar and elaborate head-dress. Over the centerpiece of the façade is a somewhat similar arrangement of serpents, rising through and above the coping and effectively breaking the otherwise monotonous line.

In the north front the same conventional serpent* occurs in pairs and in varied forms in roof decorations of the over-door *calli* ornaments. This miniature *calli* or house takes third rank among the ideographic motives employed. It forms the over-lintel ornament in all cases in the south building, and is found over alternate doorways in the north building. It is in high relief, and it is said that originally seated human figures occupied some or all of the doorways. Life-sized or colossal human figures, almost in the round, form a fourth group of motives. They were set in various situations as centerpieces in the decorated fields, and several fragments remain to attest the skill and taste of the ambitious builders. The aproned shield placed at intervals along the frieze molding forms a fifth class of decorative elements.

The ground or field of the decorated spaces in all cases is the sculptured lattice work, and associated with it in three of the façades are fine, boldly drawn mosaic fret units. An important feature of the façade embellishment are the bands of miniature columns introduced at the base and in the medial and cornice moldings.

It may thus be said that these buildings employ, almost in common, some eight or ten distinct decorative elements, nearly all of which are doubtless mytho-æsthetic, and were introduced because of their associated ideas as well as for embellishment. They all occur in other buildings in Uxmal, and nearly all are found in one form or other, and often with identical treatment, in Chichen and other cities of Yucatan.

The treatment of the end and rear walls of these buildings, so far as I have learned, is comparatively simple, consisting in the main, aside from the mask-decorated corner pieces, of alternating panels of plain wall and lattice work. Human figures in high relief and phallic symbols occur on the exterior wall of the north building, but sketches of these features, kindly forwarded to me by Mr. E. H. Thompson, unfortunately came too late to be utilized in the panorama. The interiors are generally plain with plastered or partially plastered masonry, the lintels and jambs of the eastern building alone being embellished.

* Possibly the term monster would be better, as it is not quite certain for what kind of creature the figures are intended.

It is a noteworthy fact and one tending to indicate a very considerable antiquity for this group of structures, that the north building is built over and includes within its walls the ruin of an older structure, which is, however, so far as can be seen, of like character and ornamentation.

THE GYMNASIUM WALLS. Over the center of the south building of the Nunnery in the panorama, and midway between this building and the House of the Turtles, are two massive walls or oblong piles of masonry much foreshortened by their position. They appear to be the only structures built directly upon the general level of the site, though it may not be entirely amiss to regard them as substructures intended to support audience places or temples, as in the Tennis Court of Chichen. The presence of remnants of sculptured serpents about the base of one of the walls would seem to indicate that a stairway and, therefore, probably a superstructure, formerly existed. The presence of large stone rings set in the walls on opposing sides is generally regarded as indicating the use of the space between as a ball ground. The length is given by Stephens as ninety feet, the height twenty feet, and the thickness of each wall twenty feet.

THE GOVERNOR'S PALACE. Beyond the Ball-court walls, as seen in the panorama, rises the broad, triple terrace of the so-called Governor's House or Palace. The superb building crowning the summit is justly regarded as the most important single structure of its class in Yucatan, and for that matter in America. It is extremely simple in plan and outline, being a trapezoidal mass some 320 feet long, forty feet wide, and twenty-five or twenty-six feet high. It is partially separated into three parts, a long middle section and two shorter end sections, by recesses leading to two great transverse archways now walled up, but formerly passing quite through the mass.

The building faces the east, the back appearing in the panoramic view. The front wall is pierced by nine principal doorways, now much broken down above, and by the two archway openings, and presents a façade of rare beauty and great originality.* The back or west wall is unbroken, save by the two archway recesses and a recent breach in the surface masonry. It is nine feet thick below throughout nearly the whole length, and increases to twelve or thirteen feet at the level of the capstones of the interior arches, as shown in the accompanying section, Fig. 26. The arrangement of rooms and doorways is perhaps sufficiently indicated on the map which accompanies the panorama. The width of the rooms is limited by the span of the wedge-shaped arch, which rarely exceeds ten or twelve feet, but the

* The finest illustration of this building yet produced is that published by Charnay, *Ancient Cities*, etc. Plate opposite p. 394.

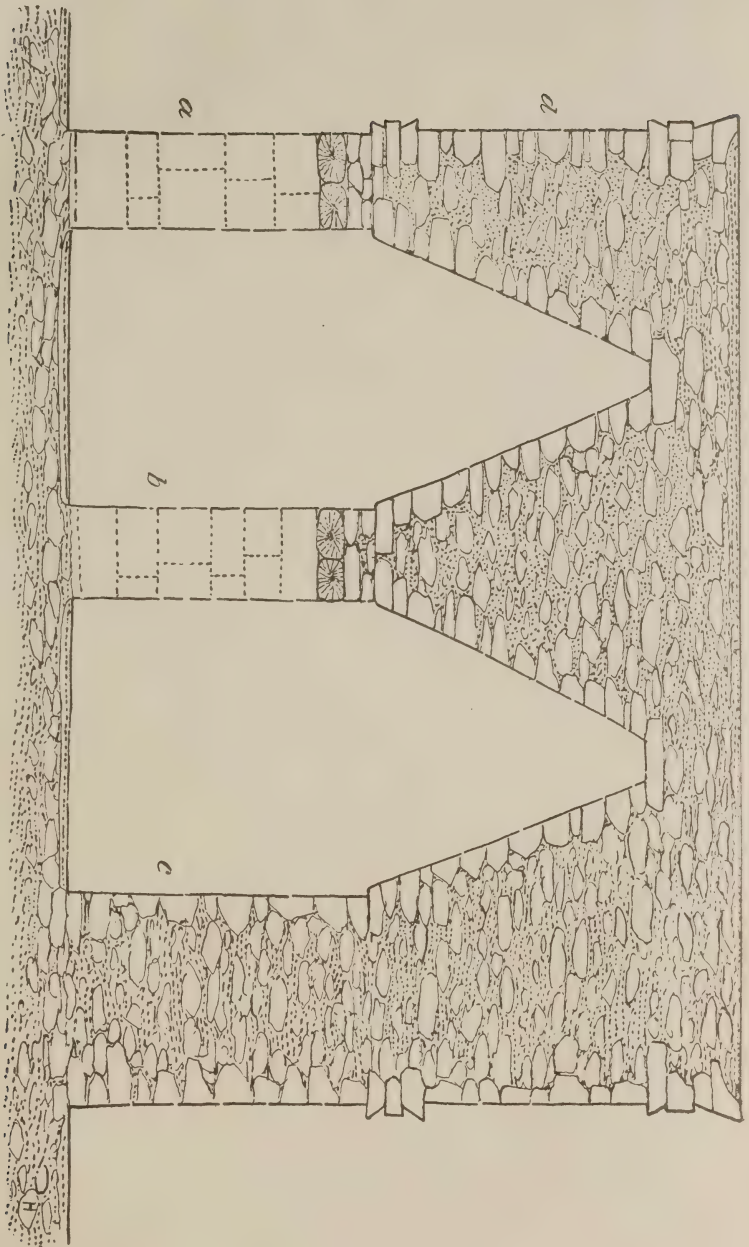


FIG. 26. TRANSVERSE SECTION OF GOVERNOR'S PALACE, UXMAL.

- a.* Outer doorway, wood lintels restored.
- b.* Inner doorway.
- c.* Back wall, 9 feet thick.
- d.* Entablature zone containing rich decorations.

length reaches sixty feet in two cases. The interior body or hearting of the walls is built of rough stones and mortar, and so well laid up that often where the casing stones have fallen, the exposed face presents the appearance of an ordinary rubble wall. It should be remarked, however, that the larger exposed faces, seen in the main façades, do not appear to represent the actual backing or bed of the facing courses, but rather the back of the soffit of the chamber vaults, as indicated by the pitch of the exposed spaces, the whole of the hearting of the wall having slid off.

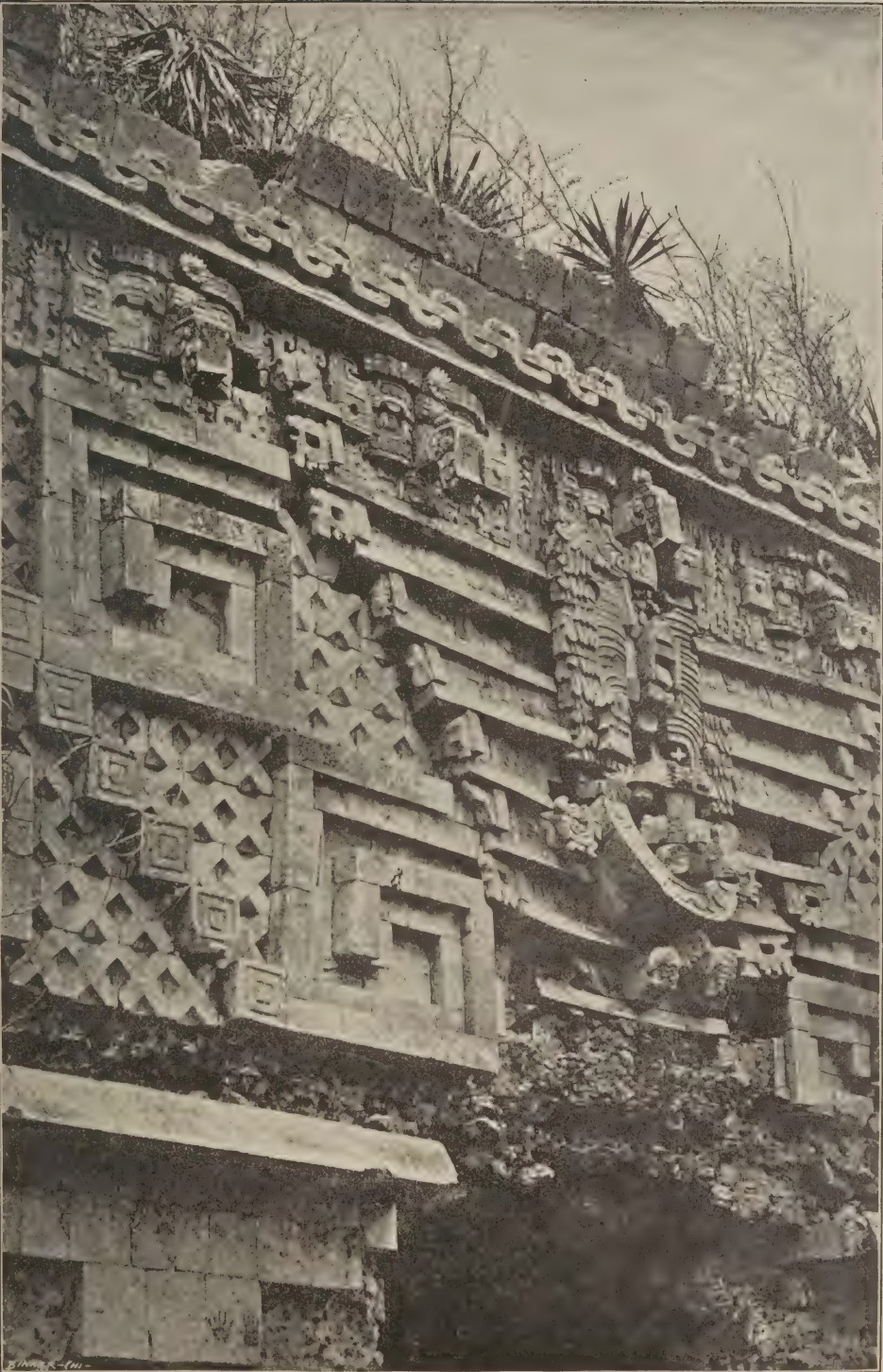
The facing of the walls within and without is of the usual light, warm gray limestone in large squarish blocks, cut and laid, in the main, with nice precision. The exterior wall surface is about twenty-six feet in height and is divided into the usual lower and upper zones, the former being only a little more than half as wide as the latter. The lower is quite plain, save a narrow band of columnar ornament at the base, and is perforated by the doorways which, through the loss of their wooden lintels, have fallen in above, leaving wide, ragged arches penetrating considerably into the upper decorated area, thus mutilating some handsome over-door ornaments.

The upper zone is bordered below by the usual bold, triple membered molding, and above by a frieze of ornamented molding which is capped with a wide, flaring, coping course, plain, save over the western gateways, where it is elaborated into a series of grotesque masks. The included zone of sculptures is about ten feet wide and extends entirely around the building. It is, therefore, 720 feet long and includes in its ornamentation, by moderate estimate, 20,000 stones, nearly all of which are sculptured and individual in shape. The setting of the complex designs, with their recessings and projections, is a masterly piece of masonry, though there is, strange to say, in all the work an apparent lack of appreciation of two of the most fundamental principles of stone laying, the transverse bond and the systematic breaking of joints.

There are three principal motives, the mask, the fret, and the lattice, employed in the design, which is elaborate and systematic but greatly diversified in effect. The leading feature is a double band of current fretwork of colossal size, set upon a ground of lattice-work. This occupies the lower seven or eight feet of the space and is accompanied above by a line of snouted masks in the usual style. This line is not carried continuously along the upper border, but, as if to avoid too great formality, breaks down over the geometric field near the outer angles of the façade, connecting with the lower end of the corner ornaments, which consist of the same mask element. Special designs occur over doorways and at the corners, and at intervals on

PL. V. PORTION OF SCULPTURED FACADE, GOVERNOR'S PALACE.

This very handsome and elaborate piece of work is a section of the embellished entablature-zone of the Palace. The height from the lower or medial molding below to the coping course above is about 10 feet. The entire length, covering the four walls of the building, is some 725 feet. If we allow that the stones employed average 6 by 12 inches in surface dimensions, this deeply coffered and relieved mosaic would comprise upwards of 20,000 pieces, all especially cut and a large percentage elaborately sculptured. Two plain coping courses are seen at the top, followed by a twined fillet molding, while under this is a line of very ornate snouted masks. The broad space below is filled with bold fret-work, set on a lattice ground and interrupted by the wonderful over-door trophy, the central feature of which is a human figure, fully life size, sculptured in the round and seated in a niche with festooned base. The head was where the minute white cross now appears, and was surmounted by an elaborate and colossal head-dress, most of which remains. The horizontal bars terminating in serpent heads at both ends are separated by lines of hieroglyphs.



OVER-DOOR ORNAMENTS, EAST FACADE, GOVERNOR'S PALACE.

the ends and sides grotesque faces with their projecting snouts are carried in very effective lines from top to base of the sculptured zone dividing the fretwork into sections. The designing and execution of this work were tasks worthy a great people and a well-matured culture.

The great beauty and boldness and the surprising elaboration of the work in this wonderful façade-mosaic are well indicated in Pl. V. which represents the central over-door design and is reproduced from a portion of one of Charnay's photographs. At the top is the wide, flaring, coping surface, formed of two courses of plain stone work, and below are the other two members of the frieze molding, the middle, square-faced one being sculptured to neatly represent a straight fillet intertwined with a meander. Next below is the row of elaborate masks, rather dimly made out, but showing the curved, broken snouts, the deep eyes, the squarish ear ornaments with pendants, the obscure mouth and the serpent brow-band upon which is set a stellar ornament. Below at the left are portions of the lattice ground and of the two rows of great frets with their connecting stems of square stones with square figures cut in the face of each. Small bits of the same are seen at the right, and between is the elaborate, over-door piece which must be regarded as one of the greatest efforts of the Maya sculptor-builder. The doorway below is broken out through decay of the lintel which was about on a level with the base of the picture.

Above the doorway was the usual three-membered molding, a part of which remains, and from the upper edge of this rose the central device consisting of a V, or keystone-shaped arrangement of horizontally placed serpents, eight or nine in number, with square, bar-like bodies and with heads at both extremities, while between the bodies in horizontal rows are indistinctly seen six or seven lines of hieroglyphs. This sculptured trophy is crossed vertically by an elaborate piece of sculpture which embodies, as its chief feature, a human figure—now badly mutilated—and its lofty and elaborate feather head-dress. The minute, white cross seen near the middle of the picture takes the place left vacant by the fall of the head of the figure. The ribbed cape and chest ornament and the arm stumps appear below, and the straight, round body with projecting devices about the waist, and the legs—the right broken off above the knee and the left below the knee—may be detected. The figure occupies a semicircular, festooned seat, and the feet probably rested on bracket-like sculptures, portions of which are still seen. The figure has been of life size or a little larger, but was much dwarfed by the colossal head-dress. In the lower left-hand corner of the picture three courses of the plain

lower wall-zone are seen, and on one of the stones are imprints of the mysterious red hand.

As seen from the west this building is a truly wonderful creation, and set high above the plain upon its stable terraces, it must have been a residence worthy of any barbarian ruler or priestly potentate. The most novel and striking features of this building are the two high, pointed archways which, with their deep recesses extending from roof to floor, break the monotony of the façades. The original function or significance of these archways is a matter for careful consideration. We cannot assume for a moment that they were designed for architectural effect, as the lines of the arches are antagonistic and harsh, yet on the other hand one cannot imagine that such colossal vaults would be constructed for mere convenience of passage back and forth through the building.

It appears to me that the only reasonable solution of the problem as to the function of these strange gateways is furnished by the theory that this structure was regarded as only one member—the first to be built—of a great quadrangle, and that the openings, not called for until the group was complete, were for the time being walled up.

Buildings of this oblong, narrow plan were usually grouped in fours about a court, and as all sides of a quadrangle could not be built at once, one would precede the others; and we are at liberty to assume that the end of these grand building operations came when this single structure was completed. The heaping up of the great terrace on the east side may have been the first step in the direction of adding the other buildings.

These arches are among the most remarkable in the country; each is approximately twenty-five feet long, ten feet wide and twenty feet high. The spring of the side walls begins near the floor and extends at a steep angle to the capstones above. Finding these great portals useless features of a single building, a wall was built midway across each, and the spaces were inclosed by adding exterior walls, forming square rooms with exterior doorways, as shown in the plan, Pl. VIII.

As a rule in these quadrangular groups, of which I have studied perhaps a hundred, one of the four structures is more important than the others, and is built upon a terrace or pyramid of superior height overlooking the court and overtopping the other buildings. Such is the case with the Nunnery Quadrangle, the House of the Magician and the House of the Pigeons, and with numerous corresponding groups in southern Mexico.

HOUSE OF THE TURTLES. This building is much inferior to most of the others in dimensions, but is regarded as a very representative and handsome structure. It is seen in the panorama at the right of the Palace and on a projection of the second terrace at the northwest

PL. VI. MIDDLE PORTION OF THE HOUSE OF THE PIGEONS.

In the middle of the picture is seen the remaining portion of the vaulted portal which led through the north building of the quadrangle into the court beyond. The façade has entirely disappeared, and sections of the front range of rooms are seen, displaying the solid masonry of partition walls and roof. Above is the remarkable roof-comb, which extended the entire length of the building along the middle of the roof. Below is the long monotonous line of door-like openings which penetrate the comb wall, having no function other than that of ornament. Above is the rigid line of moldings and over this are shown five of the nine perforated gables, erected for no other purpose than that of holding aloft elaborate sculptured decorations.



MIDDLE PORTION OF THE HOUSE OF THE PIGEONS.

corner. It is peculiar in being unassociated with other buildings. In plan it is a rectangle nearly 100 feet long and some thirty-four feet wide. The east and west ends are in an advanced stage of ruin, and portions of the walls and roof near the middle have fallen. The apartments were of the usual character and construction, but details of the plan were not made out. The exterior is exceptionally simple in its decoration, the main features being a wide band of columnar ornament, filling the upper zone of the wall, and a line of sculptured turtles set rather far apart along the frieze moldings.

HOUSE OF THE PIGEONS. This unique structure, seen in the panorama to the right of the House of the Turtles and somewhat farther away, is the ruin of the north building of another remarkable quadrangle which could appropriately be called the Quadrangle of the Nine Gables. Pl. VI shows the central part of this building, the partitions and back walls of the front tier of chambers appearing at the base behind the white figures.

The ancient builders certainly did not lack originality and boldness. We find ourselves constantly encountering the marvelous, and pausing in amazement before structures that are destined to remain riddles for all time. Here was a great building, of usual construction and size, with an arch opening through the middle into a court—as in the south building of the Nuns' Quadrangle—bearing upon its roof a colossal, masonry comb built at an enormous expenditure of time and labor. The wall of this comb is very thick below and is faced with cut stone. About four feet from the base is a band of molding of usual type which extends the full length of the building. The wall below this is perforated by a row of upwards of fifty door-like openings. Above the moldings the wall is divided into nine sections which rise in steps to some twelve feet in height, terminating in points now somewhat broken down. Only eight of these pinnacles are still standing, though I have taken the liberty of showing the full number in the panorama. Each of the gables is perforated with upwards of thirty rectangular, window-like openings arranged with varied spacing in seven horizontal rows. From the face of these gable-like piles are seen projecting stones which are all that remain of what must have been bold and effective groups of sculpture, and there can be little doubt that this colossal comb of masonry was built exclusively for the purpose of embellishing the building and holding aloft its sculptured ornaments.

The court of this quadrangle is, according to the statement of Stephens, 180 feet from east to west and 150 feet from north to south. The south building is in ruins and is penetrated by an arch similar to that in the north building just described; this is barely visible in the panorama. The east and west buildings are in an advanced state

of ruin and must have been inferior in importance to the other members of the quadrangle.

SOUTH QUADRANGLE. Beyond the Quadrangle of the Seven Gables and in the distance in the panorama is another quadrangle with a much smaller court, having low buildings on the east and west and a fine temple-crowned pyramid on the south side. The latter, according to Stephens, is some 125 feet by 200 feet in dimensions at the base and fifty feet high. The superstructure is a building of the usual style and apparently closely resembles that of the House of the Magician at the opposite end of the city. A broad, well preserved stairway leads from the front of the temple down to the court on the north.

THE GREAT PYRAMID, ETC. One of the grandest structures in Uxmal is the great truncated pyramid seen in the panorama rising at the southwest corner of the main terrace of the Palace. It is sixty or seventy feet in height and measures, according to Stephens, some 200 by 300 feet at the base. This author describes a summit platform seventy-five feet square and three feet high, and a narrow terrace extending all around the pyramid fifteen feet below the crest. The surfaces seem to have been richly decorated with characteristic sculptures. Unfortunately there was no time to visit this section of the ruins, and the two small pyramids seen at the left in the panorama had to be passed by without examination. Some photographs of the latter group in my possession show interesting architectural features, including a pierced roof-comb resembling the work on the House of the Pigeons, though not serrate. Remains of buildings and terraces are seen on all hands. Some quite important structures are located to the west of the Nunnery Quadrangle, one of which is indicated in the panorama; another farther out shows hewn stone walls and usual doorways and arched chambers.

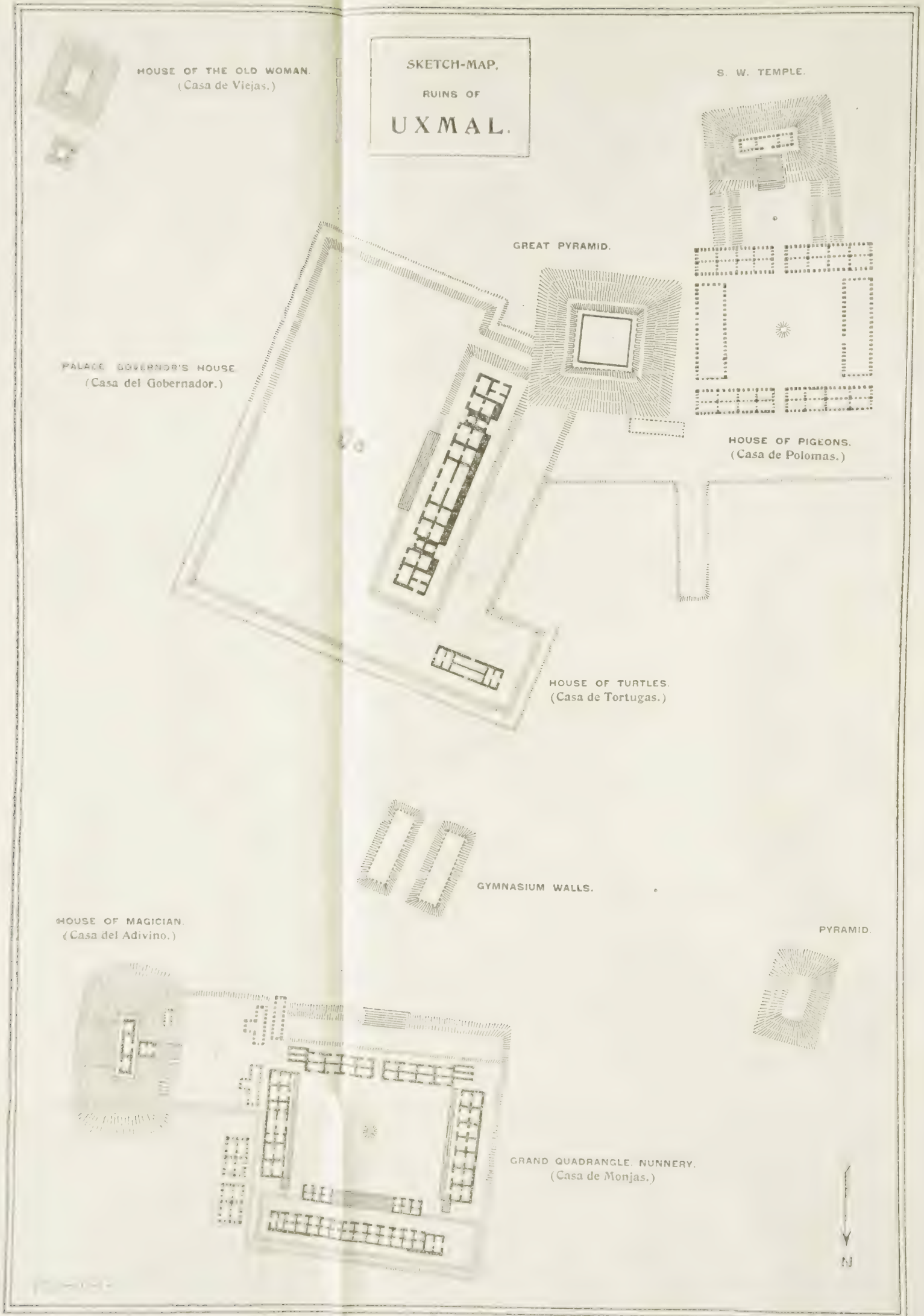
Scattered about the ruins are a number of unique and interesting sculptures. One of these was discovered by Mr. Thompson half a mile south and a little east of the Governor's Palace. It is a tapering column five feet high, twenty inches in diameter at the base and twenty-eight inches at the top, and has near the upper end two series of neatly sculptured glyphs. It is shown in Pl. VII., which is photographed from the cast made by Mr. Thompson for the Columbian Exposition and now in the Field Columbian Museum. Another, illustrated by Stephens, and now placed on the portico balustrade of the Hacienda at Uxmal, resembles a stone seat or chair, such as are seen in the Palenque bas reliefs, and has sculptured grotesque, tiger-like heads at the extremities. It probably served as an ornament or supported some important piece of statuary. A similar specimen is seen in one of Catherwood's drawings, inserted, apparently, in the lower part of an exterior wall-niche.

PL. VII. INSCRIBED STELA OR COLUMN.

This interesting object was found a little south of the Governor's Palace, Uxmal. Its height is 4 feet 9 inches, diameter at base 21 inches and at top 26 inches. A single line of glyphs encircles the upper margin of the stone and a cartouch-like group of glyphs appears on one side. These inscriptions are very neatly executed and serve to indicate the style of writing practiced by the ancients. Material, gray limestone. Photographed from a plaster cast, prepared from molds made by Mr. E. H. Thompson for the World's Columbian Exposition.



INSCRIBED STELA OR COLUMN.



POINT OF VIEW OF PANORAMA.

PAVING USED INTERIOR TROUGH

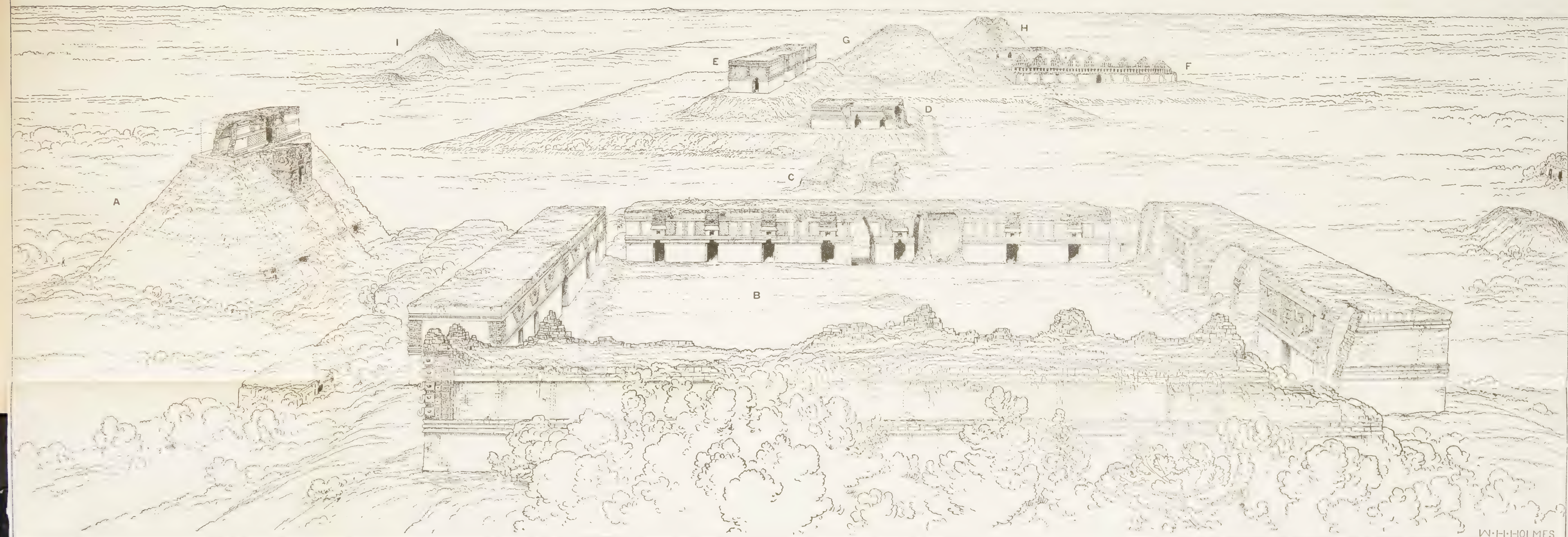
PAVING USED INTERIOR TROUGH



PIGEONS.
(omas.)

XXXXXXXXXXXXXXXXXXXX

PANORAMA OF UXMAL.



IZAMAL.

Scant justice has been done to Izamal by any of our travelers and explorers, as like ourselves they had splendid Chichen in view and hurried by, casting hasty glances to the right and left. Seeing the huge dismantled monuments of a vanished people obscured and disfigured by the weak and flimsy structures of a modern village, the student is filled with regret and sadness. Half a dozen massive mounds, rising above the general level of the village, can be distinctly seen from the house-tops surrounding the public square, and it is said that traces of many more are still to be found if search is made. Nothing whatever remains save these solid masses. Portions of cut stone facing, traces of stairways, and a few stucco ornaments are still to be seen, the latter exposed to view in recent times by the removal of debris from the slopes of the mounds. The grandest pile was recently remodeled as a fortress, and the second in size is entirely encased behind the walls and beneath the floors of a Spanish cathedral. I sought in vain for material for a panoramic view, but only fragments are in sight, and no time was to spare for negotiating with householders whose back lots and gardens, separated by high walls, divide the heritage of the ancients.

The great pyramid, situated in the northern part of the village, is seen directly ahead of the train as we approach from Merida and is one of the most imposing piles in Yucatan. Its whole height is about sixty feet. The lower terrace is upwards of twenty-five feet high and is perhaps 300 feet square at the top. From the surface of this and set back near the northern margin rises a pyramid some forty feet in height, the summit measuring thirty feet from north to south and some sixty feet from east to west.* The approach was apparently from the south by two stairways, one rising from the ground to the first level, and the other from the terrace to the truncated summit which must originally have been crowned with a temple. Portions of the cement floor still remain, though possibly not entirely aboriginal. The lower stairway is replaced by an inclined way, and recent military operations have so modified the upper flight that the original form is uncertain. Little is left exposed of the surface facing of hewn stone—the material having been convenient for house building—but numerous cut stones of large size are seen about the lower slopes. Excavation would no doubt disclose interesting remnants of the ancient walls.

Midway in the northern slope of the structure is an irregular, partially filled opening extending obliquely downward toward the

*Dimensions here given are estimates and from memory.

center of the mound. It is said to have been dug in the search for interior chambers, and the reports as to the results are very conflicting, Stephens, however, averring that he had satisfactory proofs of their existence. The mass is composed of broken limestone irregularly set in mortar. A distant view of this pile is given by Charnay.

The broad mound occupied by the Cathedral must have been a leading feature of the ancient city, and no doubt supported a temple or other important building. It seems to correspond somewhat closely with the lower terrace of the great mound in height and other dimensions.

The most interesting monument of the place is situated just west of the public square of the town and occupies the back lots and gardens of perhaps half a dozen dwellings. It is some twenty-five feet high, but is imperfectly defined in horizontal dimensions. The width at the south front is something like forty feet; the main mass extends back to the north sixty or eighty feet and then falls off to a few feet in height, connecting, apparently, through several gardens, with a considerable mass farther on. Portions of the debris that formerly veiled the walls have been removed along the south end and for some fifty or sixty feet along the sides. It is on the east side near the southeast corner that we encounter the mutilated remains of the great stucco face to which several writers have referred. Originally it was a superb work, the face, some five feet wide and seven or eight feet high, having been boldly modeled and neatly finished and painted. The chin is only a few inches above the present level of the ground. This is the head illustrated by Charnay, while the *cara grande*, a boldly modeled head, raised several feet above the ground and surrounded by rough, stone wall surface, illustrated by Stephens, appears to have been on the south face, that part of the pyramid being now obscured by buildings. I present in Fig. 27 a sketch—our photographs having failed in clearness—showing the head in its relation to the decorated space and to the side and rounded southeast corner of the pyramid. The sketch of the elaborate head-dress was hastily made, and makes no pretense at accuracy in detail. I am unable to say just how much of the base of the figure is hidden by debris.

The south end of the pyramid, to the left of the corner shown in the sketch, is now completely hidden by modern buildings. The Stephens head, if it is different from that now exposed, may have occupied this wall. The west side has been partially freed of the debris, thus exposing the walls, part of a stairway and a very fine specimen of stucco modeling. The latter is the colossal figure of



FIG. 27. SKETCH SHOWING RELATION OF GIANT STUCCO HEAD TO SIDE AND CORNER OF PYRAMID, IZAMAL.

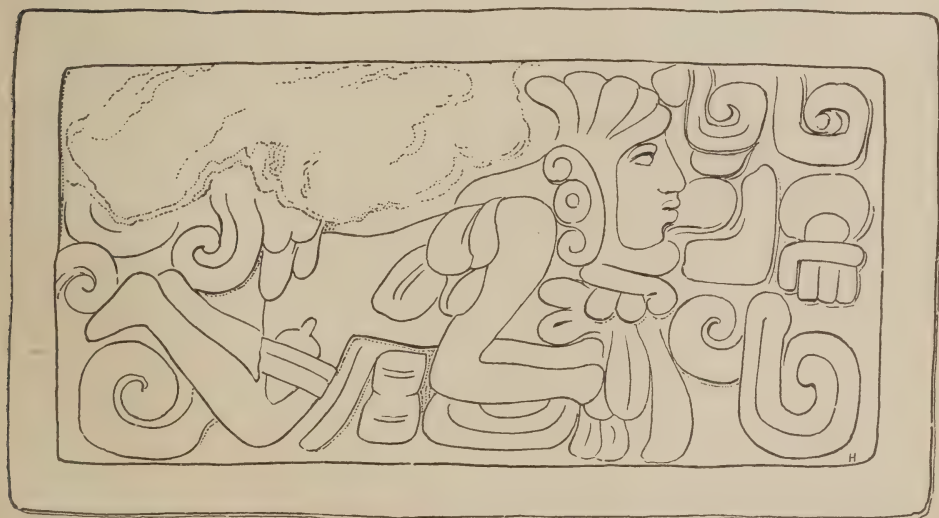
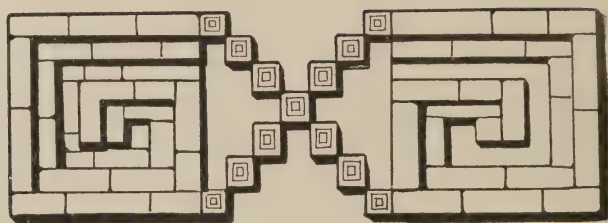


FIG. 28. SKETCH OF COLOSSAL STUCCO RELIEF, WEST SIDE OF PYRAMID, IZAMAL.

some mythical personage, spoken of by Charnay as "a crouching tiger," but it exhibits no other than human features, as shown in my sketch, Fig. 28. The figure is placed horizontally, in a panel some four feet high by eight feet long, with the face turned south, the whole pose resembling that assumed by a person pitched forward and resting on the knees and elbows. The usual ornamental plumes, and some symbol-like figures fill the interspaces. Above the back of the figure portions of the stucco have been destroyed. The modeling is in bold, well handled relief and has been finished in colors. The panel occupies a nearly vertical wall-space some twelve or fifteen feet above the base of the pyramid.



MOSAIC FRET-WORK, FACADE OF THE GOVERNOR'S PALACE, UXMAL.

Length, eight feet.

CHICHEN-ITZA.

Chichen-Itza—the mouths of the wells of Itzas—is the name given to the most important group of ruins in Yucatan; although it has no single monument to rival the Governor's Palace or the Nunnery Quadrangle at Uxmal, it outranks that city in extent and in the number and variety of its remains. Mr. E. H. Thompson, who has visited, or thoroughly familiarized himself with, all the centers of Maya culture, recognizes the superiority of Chichen as a field for research and has settled down here with the intention of devoting the best years of his life to a monographic study. If he should live to carry out his plan, and he is yet a young man and fully acclimated in Yucatan, we may look forward to a fitting and satisfactory presentation of at least one of the ancient cities of the New World before the processes of nature, aided by the violent hand of man, shall have finally leveled them with the ground. What I present here is the mearest sketch such as any archeologist visitor of a few days might glean from surface phenomena, and will not in the least handicap Mr. Thompson in his contemplated work. I hope, however, that it may in a measure aid him through its suggestiveness as to various features and problems and as to the means of presenting them graphically.

Like Uxmal, Chichen is situated in the midst of a forest-covered plain whose monotony is broken only by minor irregularities of the rocky surface. Geologically the country is composed of soft, whitish, horizontally-bedded limestones of late pliocene or early pleistocene age, and the surface appears to have been little modified since its elevation above the sea. Minor changes have taken place mainly through the breaking up of the superficial strata. This has occurred along irregularities of sub-aqueous or shore-line formation mainly through the wedge-like action of forest roots aided by decay and gravitation. These agencies have tended to round the topographic forms, to reduce the height of elevations and fill up the depressions.

Another important class of agencies has been at work producing innumerable small depressions and cavernous openings which now exhibit various stages of development and degeneracy. As described in the introductory pages the limestones have been perforated in various directions by the waters, which in this land of forests are always charged with corroding acids, and underground channels have been formed leading down toward sea-level and outward toward the sea. Enlargements of these channels have in cases taken the form of gaping caverns, and again have led to the falling in of roofs all along the

drainage course forming sinks, some of which expose the waters beneath. In the Chichen region these features consist of several rounded pits or wells of large size, containing pools of water from which the necessary supply of that precious liquid was obtained in ancient times. Two great wells of this type, called cenotes, occur within the limits of Chichen. Besides these, several conical sinks, possibly dead wells, are also seen; other wells and sinks of varied conformation are found on all hands without the city limits. To the existence of these natural wells we undoubtedly owe the presence of the ancient peoples and the building of cities in this unpromising region, for there is no running water in all this part of Yucatan.

This place was one of the most important centers of Maya culture during the prosperous period preceding the coming of the Spanish, and, though it was occupied by its builders for nearly 200 years after the discovery, little is known definitely of its history. I shall not stop to review either the historic or archeological literature of the city, as others have done so at considerable length, and we may reasonably expect that an exhaustive monograph will soon be forthcoming from the pen of Mr. Thompson.

Fifty years ago the site of Chichen was a prosperous hacienda with the considerable village of Pisté near by, but the southern tribes rose and massacred or drove out all the inhabitants. Since then the wilderness has again claimed the region, and but for recent clearings by explorers, and a few native cornfields in the vicinity, slight trace of the once prosperous city would now be visible even to the bird that hovers over the forest.

The principal ruins of this group are included within a space considerably less than a mile square, and consist of half a dozen important piles with numerous remains of inferior structures scattered about, some of the latter being so completely buried in the forest that their exploration has never been undertaken. A glance at the various monuments and their assemblage upon the site quickly dispels any notion that may have been formed of the existence here of anything like a modern city. The great buildings are not so scattered, perhaps, or so diverse in their orientation as the principal structures of such cities as Rome and Paris, but the points of the compass were but lightly considered, and there are no indications of lining up in any direction to suggest streets, squares or systematic grouping. Historians speak of roadways radiating through the forest and connecting with other centers, but the traces are so meager as to have commanded little attention.

In plan and dimensions the buildings are greatly diversified. The pyramid-temple, of which there are over a dozen examples in

various stages of ruin, may be regarded as the prevailing type of structure. The ground plans generally show very simple arrangements of corridors, vestibules and chambers, the number of apartments being small and in no case exceeding twenty; the most unique features are found in the Caracol or Round Tower. There is no building in which one story is superposed upon another—save perhaps in the Caracol where the evidence is somewhat indefinite—and underground structures are unknown. Several buildings are founded on the original surface of the ground or upon sites but slightly leveled up, while others occupy artificial terraces and pyramids of greatly diversified height, outline and manner of treatment. Walls of buildings are usually nearly vertical, exceptionally a little flaring, and in one or two cases the upper wall-zone slopes inward, becoming, in a sense, part of the roof. The lower zone is usually plain, and the upper, where vertical, is with rare exceptions decorated with panels of composite sculpture.

The roof is level and surfaced with cement, and the floors also are usually of cement. The arches employed in ceiling all apartments are wedge-shaped and include two varieties. In one style the inward sloping walls are closed above with a row of horizontally-placed slabs, and the other by two lines of slabs leaning together at the top. Doorways and openings of all sorts are spanned by horizontal lintels of wood or stone. Doorways are of moderate or large size and bear no evidence of the association of doors of solid material.

The materials employed by the Chichen builders are the soft, light-gray limestones of the locality—largely quarried, no doubt, in the immediate vicinity—and ordinary lime-sand mortar, besides wood and other vegetal materials, preserved in a few instances only. The hearting of the pyramids and thicker walls is composed of broken stones and mortar irregularly thrown together yet forming generally very compact and stable bodies.

Ordinary surface masonry, especially in the less pretentious buildings, is of irregular, imperfectly hewn stones, laid up with little apparent skill, transverse bonding and the proper breaking of joints being sadly neglected. All important wall spaces in the principal buildings are faced with accurately hewn blocks, neatly laid but with little mortar save at the back. Lintels, jamb stones, corner-pieces, cornices, coping, columns, pillars, balustrades, sculptured interiors and the like are of large stones well dressed and skillfully laid. The greatest skill of the mason was not shown until he essayed to place the composite sculptured decorations of the great façades, a complicated and difficult operation. Here, as elsewhere, the wooden lintel was the weak feature of the construction, and its use led to the premature destruction of many an important façade.

The Chichen sculptor seems to have worked in the round and in various degrees of relief with equal facility, and composite sculpture, in which many separately carved pieces were set together in colossal designs, was practiced with remarkable success. The work is everywhere characterized by rude vigor rather than by refinement of conception or delicacy of execution. Sculpture was employed for little else than architectural embellishment, and it is not quite certain that any of the human or animal figures found about the ruins were statuary in the sense that they were to be independently installed and separately viewed or adored. I saw nothing that by its character or placement could be safely classed as an idol pure and simple. The tigers are probably seats, the serpents form columns or balustrades, the standing human figures are mainly of caryatid-atlantean type and served as supports for tables or altars; and even the recumbent, Chac-Mools of Le Plongon, must have been intended for altars or for supporting some feature of the temples in which they are found.

The study of even a single example of the great façades is sufficient to impress upon one the vast importance of the sculptor's work, but the immense range of his field is appreciated when the heavy rattle-snake columns, the colossal serpent balustrades, the long lines of caryatid-atlantean figures, and the graphic relief sculptures of temple interiors and pillars have been passed in review. The life subjects had perhaps in all cases a mythologic origin and application, being employed in buildings or situations consistent with their symbolism. Purely geometric motives are numerous, important and highly varied and specialized, indicating on the part of this people, a ripe experience in various branches of art in which the æsthetic had equal consideration with the symbolic.

The tools used in the execution of these works were probably wholly of stone, and sledges and chisels of that material are occasionally found, but the surface of the ground is so completely obscured by vegetation and so buried in the debris of buildings that little opportunity is offered of securing specimens.

Modeling in stucco seems to have met with but little favor in Chichen, but the use of plaster was universal; every imperfect surface was leveled up by this means, and all surfaces, whatsoever their material, degree of finish or elaboration of design, were treated with color. The colors employed were varied and brilliant, and retain their brightness to-day where reasonably protected from the weather. Interior wall surfaces were in many instances finished in various formal and geometric designs, as well as with glyphs, symbolic figures and elaborate graphic subjects.

The function of the various structures was doubtless in the main

religious, the typical temple prevailing over all other forms of building. The names given the various structures are rarely especially appropriate, and serve no other purpose than that of convenience of designation. A few are descriptive, and hence good, and I have taken the liberty of suggesting a few additional names of this class that may be useful.

The builders of Chichen were of Maya stock, but, dwelling in the midst of a unique environment and much isolated from the other branches of the family, there had grown up wide distinctions between their art and that of other sections. The period of occupation, though apparently unbroken, was undoubtedly a long one, covering probably five centuries or more, and extending down to and beyond the coming of the Spanish conquerors.

PANORAMIC VIEW. Though most of the larger ruins are now more or less distinctly visible from the lofty crest of El Castillo, the Caracol or the Palace, there is no point from which all can be comprehended in a single view, so that my panorama had to be constructed from an assumed point of view. The point chosen is a little to the south of the Palace, as indicated on the accompanying map, and at a height of about 150 feet. The drawing from this assumed point was easy on account of the excellent view obtained from the top of the Palace; and with this view as a basis a careful study of the individual structures with respect to their obscured southern faces, has made it easy to present a consistent and comprehensive panorama, though lack of time has rendered it impossible to execute it in much detail. In the foreground is the group of the Nunnery or Palace, **A**, with its annexed buildings, **B** and **C**, seen from the rear. To the right of this is the low box-like form of the Akab-tzib, **D**, with a deep sink descending from its east front. An oblong pyramid, robbed of its superstructure by modern house builders, is seen in the foreground, and a small mound appears at the left; and beyond and over the east end of the Palace is the Caracol or round tower, **E**. To the left of this come first the squarish mass of Chichanchob or Red House, **F**, and beyond over the top of the Palace is the ruined pyramid-temple, **G**. Near the center of the picture is a small pyramid, from which the temple has almost completely disappeared, and beyond this is the Ball-court or Gymnasium, **H**. El Castillo or the castle, so-called, with its lofty, stepped pyramid, **I**, is a little to the right; still farther on is a small pyramid, and to the right are two considerable temple-pyramids connected with an extensive system of ruins, **J**, of which little is yet known. Two cenotes are indicated, the Cenote Grande at **K**, in the middle of the picture, and the Sacred Cenote at **L**, about a mile from the point of view. Pisté would

appear at **P**. The forest has been largely omitted, and where debris obscures known forms it also has been ignored.

The general view of the plain obtained from the higher buildings is one not easily forgotten. The forest, forming a carpet of rich autumn colors, is unbroken save by the ruins near at hand whose summits rise above the tree-tops, and a pyramidal mass on the horizon far to the southwest.

THE NUNNERY OR PALACE. The so-called Nunnery or Palace, **A**, seen in the immediate foreground of the panorama, is one of the most interesting and important buildings in Chichen. It has associated with it at the right two smaller buildings or annexes, **B** and **C**. The group appears to rest almost directly upon the original surface of the site which was, however, somewhat uneven, necessitating a good deal of leveling up, as on the south side or back where there is considerable descent from the base of the walls. A little in the rear, and to the southeast, just outside of the view, is a deep conical sink, possibly representing an extinct cenote.

It is unfortunate that the point of view chosen should bring the rear of this fine group into the foreground, throwing the north façades and the great stairway out of sight, but there is compensation in the fact that a glimpse is obtained of the east façade of the main building and the south end of the Iglesia, **B**. We are able, by the aid of the panoramic view, to comprehend at a glance the relation of the three associated structures to one another and to the rest of the monuments.

The east façade, which is one of the most remarkable pieces of architectural work in Yucatan, is illustrated by Stephens, and a portion of it is shown by Charnay. I give a more comprehensive view in Pl. X, which includes the Iglesia as well.

The main building, **A**, is composite in character, and represents apparently two or three successive stages or epochs of growth, and there are, besides, some indications of diversity of construction and style. A hasty study shows that there are three or four somewhat independent sections of the building; first the L-shaped wing on the ground level at the east end; second, the main rectangular mass with the large one-story building which it supports; and third, the small edifice crowning the pile. A closer analysis, however, gives a different result in part, and we are able to make out the relation of various features with respect to their order of construction. The original ground story structure was about 100 feet long, somewhat less in width, and as high as the present main terrace. It had vertical walls with moldings at the top, and a narrow ledge around the base some ten feet above the ground, corresponding almost

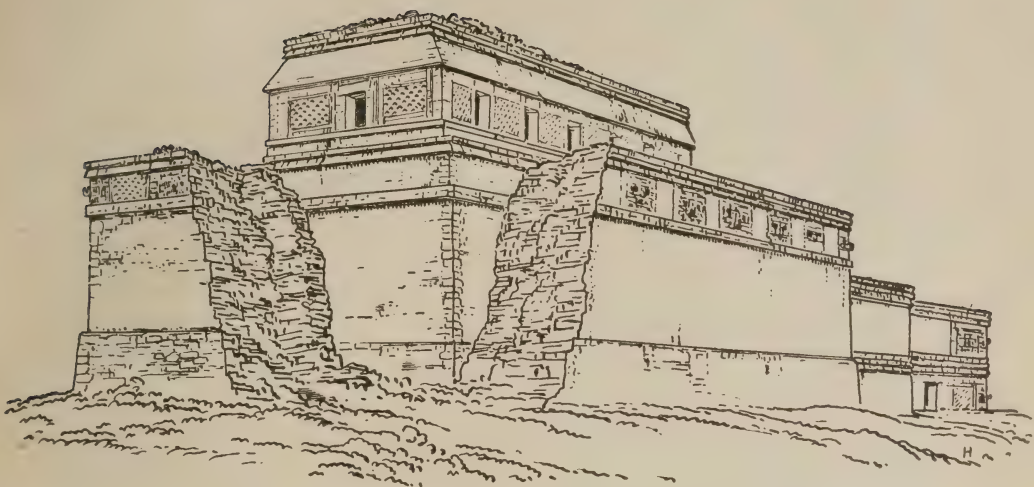


FIG. 29. SKETCH OF SOUTH-WEST CORNER OF NUNNERY OR PALACE.

Showing breach in encasing masonry and character of inner wall.

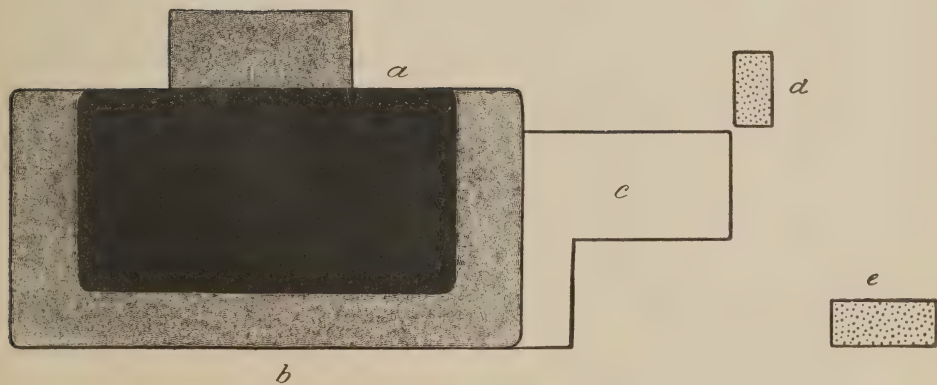
*b*

FIG. 30. PLAN OF NUNNERY OR PALACE.

Indicating probable stages of growth. The black represents the nucleus, the gray the first addition, the white the second addition. *d* and *e* are annexes.

exactly with the present outer profile. It was apparently a solid body of masonry built to support the present superstructure, with a large esplanade on the north at the head of the stairway, and narrow ledges on the east, south and west.

It is clear, that the original structure was completed all around before the great mass of encasing masonry, some twenty feet thick, was added on the three sides, forming the present wide terrace. Evidence of this is seen in the present north wall where the splicings were made, and at the southwest corner where the outer shell has fallen away, exposing the inner wall to its full height, as shown in Fig. 29. The relation of the older wall and profile to the outer wall and newer profile is clearly shown in the section, Fig. 31. It would seem from these facts that either the addition of encasing masonry was not originally contemplated, or that unusual methods of carrying out a construction were in vogue. These conditions are nearly identical with those observed at El Meco on the eastern shore, and are duplicated at Palenque, Uxmal, and elsewhere.

Observing the very narrow ledge or esplanade that would be left on the ends and south side should the encasing masonry be removed, I am led to inquire how the doorways of these portions of the building could have been entered before the terrace was added. I note first that it is somewhat unusual to find buildings of this class entered from the back opposite the stairway, and observe further that the niche-like, false doorways, seen in the inner wall of the south chamber, Pl. XI, have no significance as they stand to-day. I am thus led to surmise that the south wall may have been originally imperforate, and that access to the south rooms may have been obtained from the north side, by doorways now represented by the niches. The filling up of the north chambers and the building of a third story chamber must have made it necessary to undertake extensive changes in the way of terracing, cutting doorways and ornamenting façades.*

It seems highly probable, considering all visible phenomena, that the fine second story structure belongs to the original period of building, and it is surmised that the small crowning structure is of late date, possibly representing the latest stage of growth. The east, or ground-floor wing was not added until the encasing of the central mass was complete, as we observe that, at the point of junction in the south wall, the newer masonry is built to fit the rounded corner of the greater mass. Though these steps are apparent—and others probably remain to be observed—it seems that there is not sufficient difference in architectural style, in manner of construction, or in

* I should have mentioned the occurrence of a ledge of masonry showing in the surface of the platform a few feet from the south and east walls of the building, that may represent an early margin of the esplanade. This ledge is indicated in the panorama, and at *a* in Fig. 31.

decoration to indicate widely separated periods of building or occupancy, but the visible stages of construction are significant of prolonged occupancy of the site. That the period witnessed many changes would seem to be distinctly indicated by differences in arch construction, by variations in the profiles of the buildings and by diversity in the forms taken by certain decorative motives.

I cannot undertake to present anything like a full description of the buildings, but shall review briefly some of their principal features. The general plan is indicated on a small scale on the accompanying map. A transverse section of the main structure is presented in Fig. 31. Though the central portions are not fully made out the manner of adding the encasing masonry of the pyramid is indicated at the left, and the stairway, having similar relations to the mass, appears at the right.

Thirty-nine steps lead from the ground to the main level or esplanade above—a height of thirty-two feet. The superposed building sets back some thirty feet from the head of the stairs, and has a space upwards of twenty feet wide at the ends and on the south side. It is about ninety feet long, thirty-two feet wide and eighteen feet in height. It appears to be bi-symmetric in plan, having five doorways on each side and one on each end. The end rooms extend entirely across the building. The lateral tiers comprise three apartments each. The middle rooms are long and are supplied with three doorways each. The northern tier has been filled up with masonry presumably to form a satisfactory foundation for the superposed apartment. The end rooms are entered by single doorways. The lateral rooms on the west are nine feet wide and have a number of wall niches, resembling false doorways, at the back, imperfectly shown at the right in Pl. XI., which is a view looking west in the long hall.

The door jambs, the lintels, and the rounded corners of the building are formed of stones of large size. The most striking peculiarity of construction is the retreating profile of the upper wall, as seen in the section, a character occurring rather rarely in Yucatec buildings but almost universal in the Usumacinta province. This may have some significance as being associated with what may well be considered the most ancient building now standing in Chichen. This building is also unique in its decorative treatment. The lower wall is elaborately embellished with geometric sculptures arranged in large panels; one to each section of the wall space, as seen in the panorama. The large panels in the ends of the building are filled with heavy lattice work with dentate paneled interspaces and the sixteen side panels contain boldly sculptured, geometric patterns not seen elsewhere in this group of remains, but corresponding somewhat

in general effect, and at the sides in some details, with the snouted-mask panels in other parts of the building.

The crowning edifice is reached by a flight of twenty steps, interrupted medially near the top by a small structure, resembling a flat-topped dormer window, with a door-like opening in the front. This may have served as a shrine, but possibly had no other function than that of widening the floor space in front of the building above, or of mere embellishment. The structure above is some thirty feet long, twelve feet wide and ten or eleven feet high. It is said to have had but a single room, and is now in an advanced state of demolition. As seen from the back in the panorama it is little more than a heap of stones, save that portions of the north wall and the front doorway with its lintel are intact. Its façade is remarkable for the peculiar use of sculptured stones, stray pieces having been picked up and used without reference to the partial designs carved on them. This surface was probably plastered, or intended to be plastered, if constructed by the aboriginal builders.

The single story L-shaped eastern wing is, so far as the exterior is concerned, a superb specimen of Maya building. It seems to stand nearly on the normal ground level and is sixty feet long on the north and thirty-five feet across the east end, or top of the L, which is generally regarded as the front. The south wing or foot of the L is forty feet long and about twelve feet deep, the back abutting against the pyramid. The height is about twenty-three feet. The apartments of the main section of the building are entered by three doorways on the north, one on the east front and two on the south. The south wing has two doors, as seen in the panorama. The lower wall zone contains the doorways and has, on the north and south sides, alternating with the doors, the usual mask and lattice decorations in panels, together with some plain spaces, and the façade on the east is filled with two tiers of the great snouted masks at the right and left of the fine doorway. The upper wall-zone presents one of the most richly decorated spaces of its kind in America. The north side contains six mask panels, with three rosette panels unsymmetrically placed; the east façade has a central panel over the door, in which is the sitting figure, described farther on, and grotesque mask panels at the right and left with corner-pieces of the same. The south side has one mask panel at the outer end, the rest of the space being plain as seen in the panorama. The moldings separating the wall zones and forming the cornice above are more than usually elaborate, embodying many tasteful minor moldings, glyphs, symbols and devices. Even the flaring coping stones on the south front are embellished with three examples of what could well be taken for Tlaloc symbols, as they embody a

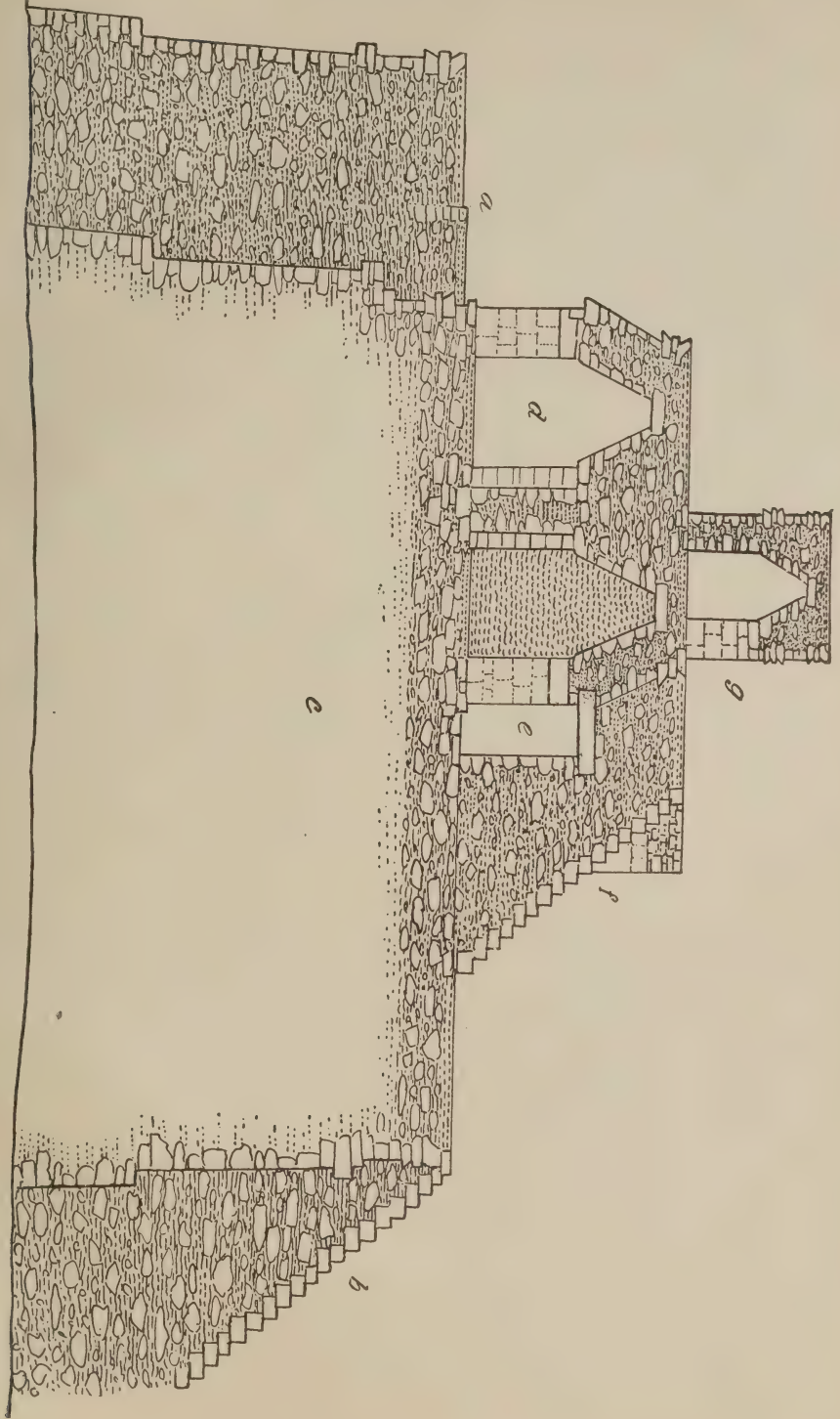


FIG. 31. SECTION OF NUNNERY OR PALACE, CHICHEN-ITZA.

Showing earliest portion, *c*, with superstructures, and additions at the right and left.

projecting snout and five or six pendant lines or grooves, suggesting the rain god of Mexico.

The panorama gives a very limited idea of the northern annex or Iglesia, as only one end is seen. It is fourteen feet wide and twenty-six feet long, and the building proper corresponds closely in height to the neighboring structures, but the façade on the west face is carried up some eight or ten feet higher, repeating the conventional ornaments of the zone below, though omitting some of its peculiar features. This flying wall is quite thick, is perforated along some of the lines of ornaments, and is backed with masonry lattice work. The lower wall-zone is of plain masonry, formerly plastered and painted, but the upper walls are entirely covered with boldly sculptured figure groups, masks and moldings, and fairly bristle with the hook-like mask-snouts. The walls incline outward slightly, giving the building a top-heavy look. A single and very plain doorway gives entrance to the chamber which is arched as usual and without notable features.

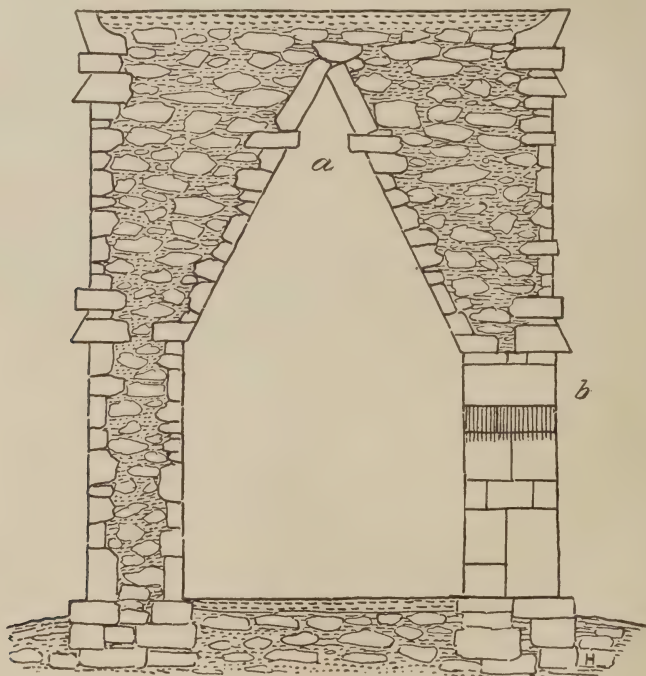


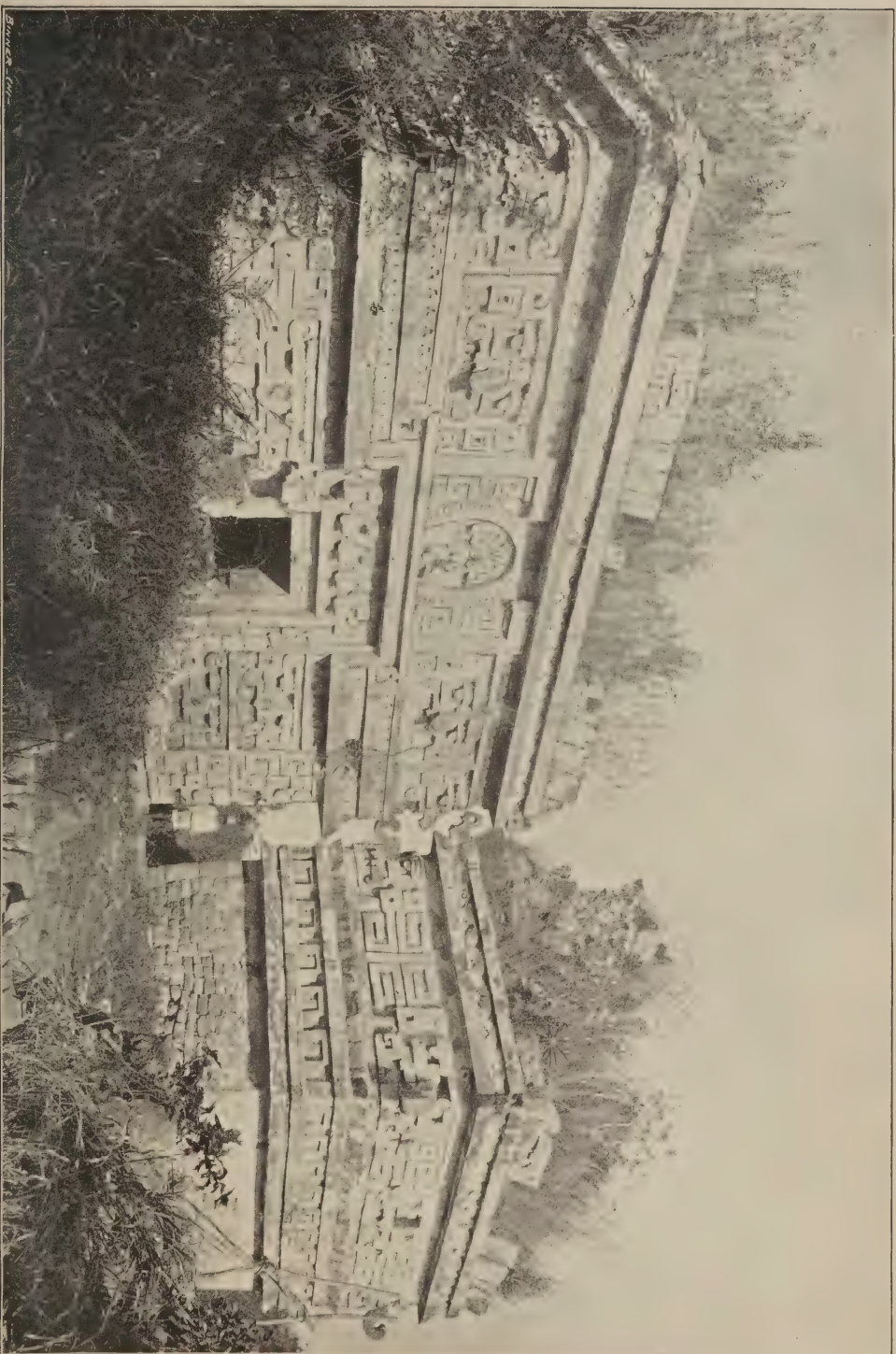
FIG. 32. SECTION OF LARGER ANNEX, PALACE, CHICHEN-ITZA.

a. Arch with lean-to apex.
b. Doorway with stone lintel; North side.

In the panorama the outer annex, at the right, C, is seen from the rear. The end and back walls are quite plain, save for the two rigid

PL. X. EAST FACADE AND IGLESIA, NUNNERY OR PALACE.

The east front of the ground-floor section of the Palace is seen at the left. It is characterized by unusually bold and effective ornament, both lower and upper wall-zones being covered with sculptures. Two lines of snouted masks appear in the lower zone and one line in the upper. The medial and frieze moldings are embellished with geometric ornaments and the coping course is sculptured. The doorway is an elegant piece of work and is unique in many respects. Above is a center piece of much interest, the main feature of which is a human figure, probably representing a chief deity, in high relief, seated in an arched niche, with the usual, conventional, feather designs at the right and left. At the right is the Iglesia annex, a single-room structure, similar to the main building in general treatment, but having a plain lower wall-zone. The façade, which is on the west side and not visible in the plate, is surmounted by a high, richly decorated false front. Mask snouts, most of which are broken, are seen in profile at the corners. Photograph by Dr. C. F. Millspaugh.



EAST FACADE AND IGLESIA, NUNNERY OR PALACE.

bands of moldings. The front is finished and ornamented in a style resembling the adjoining buildings, the lower wall being plain and the upper decorated with masks alternating with lattice panels. It is a block-like pile, thirty-eight feet long, fourteen feet wide and twenty feet high, and contains two rooms spanned above by the wedge-shaped arch, corbellate as usual below, but finished at the apex with two rows of leaning stones instead of horizontal slabs, as seen in Fig. 32. The entrance proper was by a north doorway of usual style to the present east room, and from this a doorway led into a west room. A second doorway opened through the east wall into an apartment now entirely removed; the contact lines seen on the wall indicating that it was of inferior size.

In its decorative features this group of structures is of exceptional interest and may be spoken of at some length. The façade of the east wing of the main building, and the west face or front of the smaller annex or *Iglesia*, are marvels of elaboration, boldness of sculpture, and originality of design. In the former case the decorations cover the front from base to coping, and this is true of parts of the north and south walls, but in the latter case and in all the other ground-floor walls, the lower zone is plain. A reversal of this order is seen in the main second-story building, where the lower zone is decorated, and the upper zone, which is sloping, is plain. In this upper building we have only geometric motives; in the other cases the leading motive is the grotesque snouted mask. The lattice motive worked out in many styles occurs throughout the group. In some places this motive alternates with the mask, and again the mask occupies the entire space.

In the walls of the central sub-structure the only decoration is a frieze band, some five feet wide (see panorama), in which the mask panels alternate with lattice panels, boldly sculptured masks occupying the corner spaces. In the north wall of the east wing of the main building, effective rosette designs, possibly developed from the lattice motive, alternate with masks. The probable significance of this association of decorative elements in Maya structures will be dwelt upon in a subsequent section.

Three special groups of sculpture are observed. The most striking is that of a human figure of about life size occupying a recessed panel over the door in the main façade of the east wing. The much mutilated figure is sculptured mainly in the round and is seated on the sill of the niche. It is supplied with an elaborate head-dress and surrounded by an arched framework of radiating dentals, possibly representing feathers or light-rays. Outside of this, but still within the panel, are scroll-plumes of the type seen at the right and left in all

the mask panels, thus suggesting the identity of the idea involved in masks and in figure. The panel is bordered or framed in at the right and left and above by two serpents whose bodies are covered with zig-zag, water-symbol lines, the heads facing each other at the top. The doorway below is a remarkable example of Maya portal treatment, in which the snout-hook motive is effectively employed in decorating spaces at the sides and over the lintel. The stone lintel exhibits two lines of glyphs, interrupted in the middle by a grotesque ornament. The remainder of the façade spaces are occupied by the great snouted masks and by the varied and elaborate moldings. These features are shown in Pl. X.

The other special features referred to are found in the main or western façade of the smaller annex or Iglesia, not visible either in the panorama or in the plate. The middle portion of the main decorated wall-zone is occupied by an especially striking and elaborate snouted mask nine feet long by five feet high, against the brow of which was set a human figure of approximately life size, now nearly destroyed. Next this mask at the sides are two deep niches, each occupied by sculptured figures in full relief. In the space at the left is the figure of a man facing another figure not sufficiently complete to be readily made out; in the right-hand niche are two human figures, one facing to the left and the other to the front. They are seated on horizontal ledges of stone, beneath which are obliquely placed stones suggesting the legs of a bench. No doubt these groups, as well as the various other zoömorphie subjects in all parts of the group of buildings, were symbolic and significant in their particular associations.

Beside these principal subjects, occupying the great spaces, there are several varieties of subordinate ornament filling molding surfaces, narrow zones and minor spaces. They include beadings, dentals, zig-zags, guilloches, scrolls, frets, etc., and greatly enhance the richness of the effects. The walls, exterior and interior, have been carefully plastered, smoothed and painted; and in various places designs in color have been added, traces of which are yet seen within the rooms of the second story structure.

AKAB-TZIB. A few hundred feet beyond the Iglesia annex of the Palace, at the right in the panorama, is a low rectangular building known by the name of Akab-tzib. It has a very limited architectural interest, and may be passed by without lengthy comment. It is built on the original surface of the ground and on the west margin of a great, conical sink which is irregular in outline and measures in greatest diameter some three hundred or four hundred feet, and has a depth of thirty or forty feet. The length of the building,

PL. XI. A CHARACTERISTIC MAYA VAULTED CHAMBER.

View looking west in the long chamber, south front of the main upper building of the Nunnery or Palace, Chichen-Itza. The masonry is fairly well laid, but the stones are irregular in shape and imperfectly faced. The original coatings of plaster are largely removed, but remnants retain traces of elaborate paintings. The doorways are at the left, while at the right are seen four recesses 20 inches deep and resembling doorways in their construction.

The length of the room is 47 feet, the width 7 feet, and the full height to capstones of the vault some 14 feet.



A CHARACTERISTIC MAYA VAULTED CHAMBER.

according to my rather unsatisfactory measurements, is about one hundred and sixty-five feet, its width forty-eight feet and its height eighteen feet. The walls are thick, well built and faced inside and out with neatly hewn stone, but there is a total absence of sculptured decoration, the façades being broken only by the usual medial and upper lines of rigid moldings, and by offsets in the north and south walls.

The west façade is broken into three nearly equal sections by two shallow vertical recesses three feet six inches wide. The middle part, fifty-six feet long, is set a little back and contains three doorways. The wall here is much broken down, and it is said by Stephens that the space was formerly occupied by a stairway, though no traces of it are now to be found. The east wall, facing the sink, is interrupted by an abutting body of masonry which seems to have been built to strengthen the center of the structure on that side, possibly with the idea in view of adding a second story building. This theory is confirmed by the fact that the eastern apartments behind this projection are filled in solid. The stairway would naturally occupy the opposite space on the west side, but it seems to be doubtful if this feature had yet been added when building operations ceased. The north and south sections of the building are each some fifty-two feet long and have two doors on the east side, two on the west, while one door enters from the south end, and one from the north.

Having lost my plan of the building I am unable to describe the apartments in detail. There are said to be eighteen rooms—a greater number than in any other building in Chichen. All are spanned by the usual arch. The roof is flat and perfectly preserved and supports a dense growth of forest trees.

The only feature of especial interest connected with this building is an inscribed lintel found between two apartments at the south end, and illustrated by both Stephens and Charnay. The seated figure of a man in low relief, with inscriptions at the right and left, occupies the under side of the lintel and a double line of glyphs covers the face. The light is dim at this point, and the inscription came to be called *Akab-tzib*, or writing in the dark, by the Maya residents, thus furnishing a name for the building. My sketches do not make it clear whether the doorway in the south end of this building, by which the inscription doorway is reached, is in the middle of the wall, as in the panorama, or toward one side.

THE ROUND TOWER OR CARACOL. About two hundred feet to the west of *Akab-tzib* are the remains of two structures of inferior dimensions. The eastern one, almost leveled with the ground, exhibits cut stone and remnants of round columns. The other is a small

pyramidal mound some twenty feet in height. To the left of this, and just over the Iglesia in the panorama, is the most unique and extraordinary structure in Yucatan. It is the Caracol or winding stair, so called because of a spiral passageway extending upward through the columnar, central mass of the building. Such accounts of this building as have come to my notice are meager and full of inaccuracies, and my description may, therefore, be as full as my observations will permit. At best much will yet remain to be brought out. In orientation this structure agrees pretty closely with the points of the compass, and the exterior doorways accord in placement with the sides of the terraces. As clearly indicated in the panorama, the ruin comprises three principal features, a wide foundation terrace, a smaller upper terrace and a turret-like superstructure.

The lower terrace measures about 220 feet from north to south, 150 from east to west, and is twenty feet high. The faces are vertical in a general way, and consist of a plain zone below, twelve feet wide, and a heavy two-member cornice at the top six feet wide. The masonry facing is irregular and open, but was probably fully plastered during the period of occupation. The stairway is on the west side, and is some forty-five feet wide, and bordered originally by balustrades, formed, as in other cases in Chichen, of colossal serpents, the heads resting on the ground. The second terrace is some sixty by eighty feet in horizontal extent and is twelve feet high. The stairway seems to correspond in character and position with the lower flight, though I was not able to give it deserved attention.

The ruined turret occupies a central position on the upper level, and is about thirty-nine feet in diameter and nearly the same in height. Its state of demolition is such that the exterior conformation cannot be fully made out, and the section given in Fig. 33 leaves portions of the upper profile in doubt, as indicated by the dotted lines. The ground plan is presented in Fig. 34. It is seen that there are two concentric circular walls, inclosing two annular galleries and a central core. The walls approximate two and one-half feet in thickness, the outer being pierced by four doorways placed to coincide with the points of the compass, and the inner by four doorways alternating in position with the outer ones, though not quite equally spaced.

The central core is about seven feet in diameter at the base and eight feet at the spring of the arch, some eight or ten feet from the floor. The outer inclosure or annular chamber is five feet wide and about 100 feet in circumference as measured along the outer margin. The height of the walls to the offset at the spring of the arch is about ten feet. The arch is narrow and acutely pointed

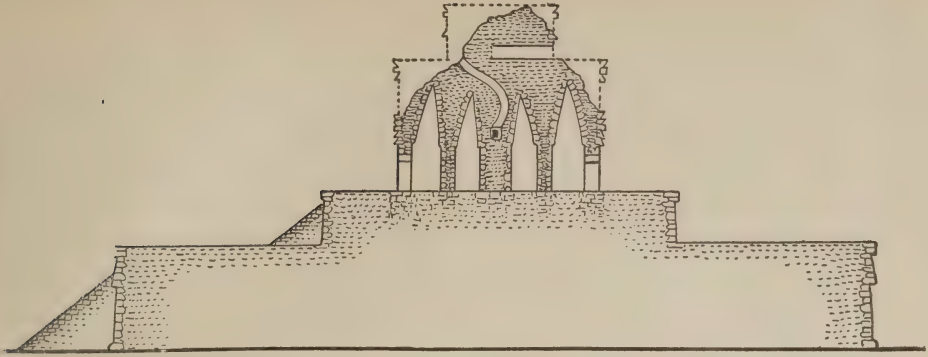


FIG. 33. SECTION OF ROUND TOWER OR CARACOL.
With its terraces and hypothetic profile of upper portion of turrets.

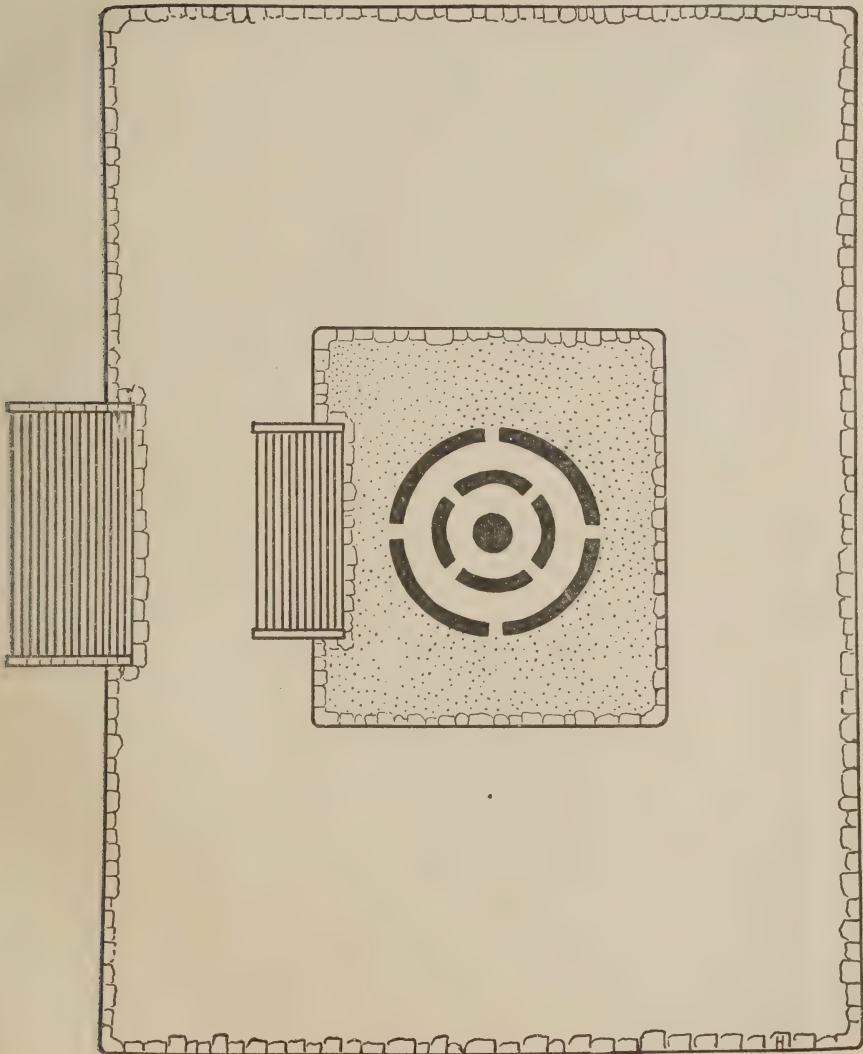


FIG. 34. PLAN OF ROUND TOWER OR CARACOL.
With its terraces and stairways Dotted surface indicates upper platform.

above, the full height from the floor being about twenty-four feet. The inner space is also nearly five feet wide, and corresponds in general character with the outer gallery, but the arch is not so high by three or four feet. As seen in the section, the arches are not symmetric in profile, the outer soffit slope being slightly greater than the inner in both cases. The central column expands above to form the soffit of the vault, and is twelve or thirteen feet in diameter at the apex of the arch.

The conformation and constructive peculiarities of the building are clearly shown in the graphic section presented in Pl. XII. Novel features of the construction of the inner arch are the bracing of the walls with numerous wooden beams and with connecting walls of masonry. There are three of the latter, two of which appear in the plate, that at the left being somewhat out of drawing, as it should connect with the enclosing wall farther to the front. They are supported on heavy stone beams spanning the vault at the spring of the arch, and reach upward to the apex.

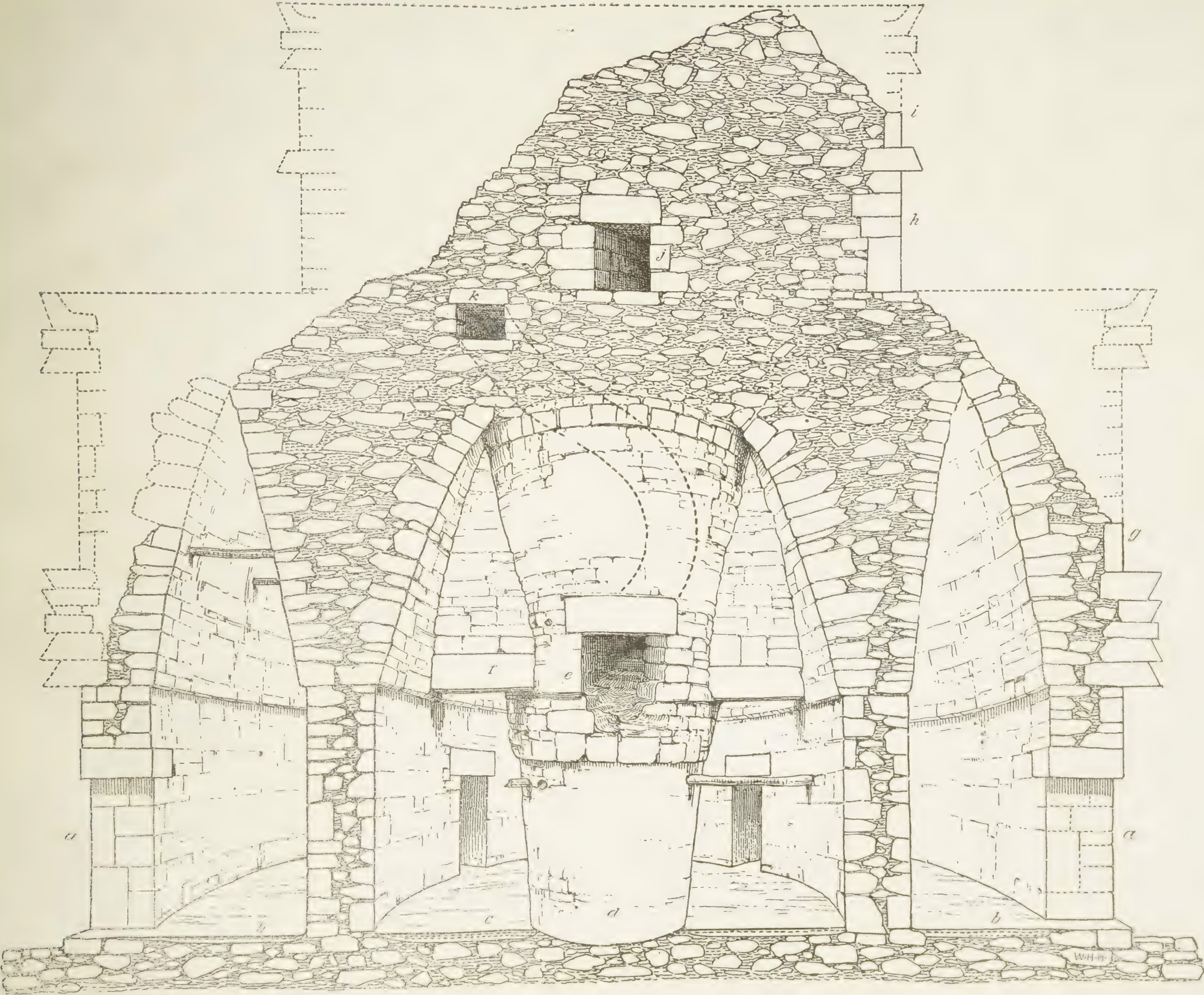
The outer wall of each vault is a kind of lean-to, as the inner section of the building was probably completed in a sense before the next outer portion was added. The inner slope rises at a steep angle, the outer coming forward to meet it at a lower angle. The stones are arranged toward the top to approximate the effect of the keystone arch. I have drawn the central columnar core complete that its character and relations might be more clearly brought out, though the section is as a result somewhat warped.

The entrance to that remarkable feature of the tower, the so-called winding stairway, is shown in this drawing. The opening is about twenty-two inches wide and from twenty-five to thirty-five inches high. It is capped with a heavy lintel-stone dressed with the curve of the wall; the sides or jambs are rather rudely built, and the base, though quite irregular, is carefully plastered over, showing that no well-hewn sill was ever used. This opening is some ten feet from the floor. By piling up debris below I was able to crawl into the dark passage. There are irregular steps, rudely laid, the walls are reasonably smooth, and the ceiling rises in steps corresponding somewhat with the stairs. The passage turns to the right, ascending at an angle of perhaps forty-five or fifty degrees, is dark and barely large enough to permit the passage of a single person of medium size. Having crawled upward some fifteen feet, making meantime nearly one circuit of the building, my head came out among the bushes on the steep broken slope facing the northeast and a little inside of and above the apex of the outer arch. Cutting away the brush, it was not difficult to get out and creep upward to the crest, some twelve feet higher.

PL. XII. GRAPHIC SECTION OF THE CARACOL OR ROUND TOWER.

This building consists of two turrets—a smaller superposed upon a larger. The lower is some 39 feet in diameter and 28 feet in height; the upper—in an advanced state of ruin—approximates 20 feet in diameter and 12 feet in height. Details of the restored profile are theoretic. This building is unique in its two annular galleries, its central column, its winding stairway and its nearly solid second story.

- aa.* Doorways in outer wall, facing east and west.
- bb.* Outer annular gallery, 5 feet wide.
- c.* Inner annular gallery, 5 feet wide.
- d.* Central column of masonry, 7 feet in diameter at base.
- e.* Entrance to winding stair.
- f.* Stone, supporting buttress walls (incorrectly connected in the drawing) which are intended to strengthen the arch.
- g.* Stone in place indicating verticality of the entablature.
- h.* Masonry at side of entrance to tunnel in upper turret.
- i.* Stone in place indicating verticality of upper entablature.
- j.* Section of tunnel passing through upper turret and probably connecting directly or indirectly with the upper opening of the winding stair.
- k.* Section of stair-passage near upper end.



GRAPHIC SECTION OF THE CARACOL OR ROUND TOWER, WITH HYPOTHETIC PROFILE.

Where the original termination of the passage was located cannot now be made out but I incline to the view that it was upon the terrace floor surrounding the upper turret, or possibly in a small gallery perforating the upper mass horizontally, as such a gallery was found passing through the turret from east to west. This passageway is one of the numerous unique features of the structure. It is thirty-six inches high, twenty-two inches wide and about ten feet long, and is faced with cut-stone as indicated in the section. What appears to be a door or window, seen on the west side of the summit, but not visible in the drawing, is only the opening of this passage finished with jambs and lintel of cut stone. It is probable that the other openings in the tottering summit-mass, seen from the southwest, are of like character, or otherwise only dummy doorways. This point could not be determined as the masonry was in such an unstable state that it was unsafe to venture farther along the steep margins of the tower.

So far as I could make out, there appears to be no room in the narrow, summit remnant of masonry for chambers. The east entrance to the passageway just referred to is broken down and the opening is seen in the crumbling slope. The floor is about four feet above the crest of the higher or outer arch and the opening in the ragged masonry slope is so situated with respect to the opening of the winding stairs as to give the impression that the two passages may have met somewhere in that part of the body of masonry now broken down. It is more likely, however, that both opened upon the upper surface of the great turret, the one horizontally and the other from below.

As I had no time to verify the orientations and measurements here given they may be somewhat inaccurate, but this will not seriously affect the general description.

The exterior conformation of this strange tower can be made out in part only. The lower wall is of ordinary masonry, finished in plaster and broken only by the four entrances. It rises nine or ten feet to the base of the formidable, five-membered molding, which projects two feet from the wall face and is five feet in width, being the only example of its kind in Yucatan. The upper margin is opposite the middle of the arch slope within, as seen in the section. The masonry at this level is four feet thick.

In studying this part of the building the very interesting question arose as to whether the exterior wall surface above this molding rose vertically or whether it sloped inward toward the upper turret. I had the good fortune to find one vertical stone, representing the first course above the molding, in place, and this I regard as conclusive

proof that the upper wall-zone was vertical. This conclusion is confirmed by the fact that in all cases in Yucatan and Chiapas, so far as I have observed, where the upper mural zone slopes, it includes with it in the slope not only all the courses above the medial moldings, but the medial moldings themselves, whereas in this case the moldings are vertical.

Examining the engraving, published by Stephens, of a similar, but single-walled round tower at Mayapan, an ancient Maya center, I find that the dome-like slope represented does not have the appearance of an original roof or inclined entablature surface, but rather that of the slope of the vault as it would appear if the outer masonry, occupying the space between the vault and the vertical façade, had slid off or gradually crumbled away, leaving the vault shell exposed.

A rise of seven or eight feet from the top of the medial molding, with three or four feet added for an upper molding and coping course, would bring the façade up to the base of the row of exterior openings seen in the upper pinnacle of the caracol ruin.

The upper part of the structure is in an advanced state of ruin, the apex of the outer arch is exposed or broken away nearly all around and the inner one is exposed in places, while the turret with its three window-like openings facing the south and west is a tottering crag. The restoration suggested in Fig. 2, though not far wrong in a general way, probably does not allow for a sufficient number of openings in the upper turret.

It is remarkable that this building should be without sculptured ornament, though there is a possibility that the upper wall-zone of both turrets has been embellished. An examination of the heaps of debris will determine this point.

Some authors are inclined to attribute the erection of this building to foreign influence, possibly to the worship of Quetzalcoatl, introduced by a colony of Aztecs, but so far as the design is concerned it is not Aztec, and the construction is purely Yucatec in every detail. It has, so far as I can discover, no striking analogies with Nahuatl work.

CHICHANCHOB OR RED HOUSE. About 400 feet northwest of the Caracol stands the so-called Red House, D in the panorama, the best preserved of the Chichen buildings. It is accurately oriented and fronts west so that blank walls only face the observer in my view. The supporting, vertical-faced terrace is ten or twelve feet high, sixty feet long from north to south and a little less in width. It is faced with ordinary masonry, large blocks forming the rounded corners and a heavy cornice projection or molding appearing at the top. The

stairway is on the west side, is twenty feet wide and has about sixteen hewn-stone steps.

The superstructure occupies a central position on the terrace, and is a little more than twenty by forty feet in horizontal extent, and is about twenty feet high to the roof. Additional height is given by a false front, five or six feet in height, decorated with open-work composite sculptures in which are included, in the principal line, three narrow, horizontally-elongated masks in the usual style. Viewed from the south, the end of a similar wall is seen on the roof midway on the south side. This wall probably takes the character of a roof-crest and may extend the full length of the building on the line of the medial wall.

Both zones of the wall proper show nothing but plain masonry and the moldings are simplified to two members each. The three rather high doorways are faced with hewn stone and open into a narrow vestibule extending the full length of the building. From this vestibule three other doorways enter as many rooms behind.

The interior surfaces were plastered and painted, but the building has been occupied a good deal in post-conquest times and it is possible that the dado in red (which may have given name to the house) and some of the borders in blue are of late date. A line of glyphs, reproduced by Stephens, extends the full length of the vestibule over the back doorways. The walls within and without have been repeatedly finished in plaster and color. Engravings of this building are given by Stephens and Charnay.

WESTERN PYRAMID-TEMPLE. Northwest, again, from the Red House, and some 200 feet distant is another small pyramid or terrace, **E**, in the panorama, crowned with the ruins of a three-chambered temple facing south. The terrace is sixty-four feet square, according to Stephens, and the style of the building corresponds closely with other like structures in Chichen. It is now so fully overgrown and so badly ruined that I did not attempt to study it.

MIDDLE GROUP. Casting the eye to the right again, we observe near the center of the panoramic field the remains of another small pyramid-temple, **G**, and in front of it on the east and less than 100 feet away, is a low pile that represents an inferior structure of the same class. Between these ruins is a low mound twenty or thirty feet square and a few feet in height, and east of the small temple is another similar pile. These mounds contain tombs, as demonstrated by Mr. Thompson, whose report on them will no doubt be replete with interest.

The principal pyramid of the group is about twenty-five feet high and perhaps sixty or seventy feet square at the base. The

sides are steep and the ascent is made by a partially preserved stairway on the east face. The balustrades represent huge serpents with incised, twined-fillet patterns on the flat upper surface, and fine heads with wide open mouths and protruding tongues extending forward on the ground. Near the top on the edge of a narrow, level space, are the remains of two square, serpent columns, the heads extending forward and connecting somewhat closely with the upper end of the balustrades. From this level space, probably occupied by a vestibule, eight or ten steps rise to the main level. Passing through a doorway, now nearly obliterated, we enter what was apparently a large apartment, where the remains of six square columns, doubtless roof supports, are still traceable. Although this temple was not as large as some others, it was, in the days of Chichen's prime, certainly a superior specimen of its class.

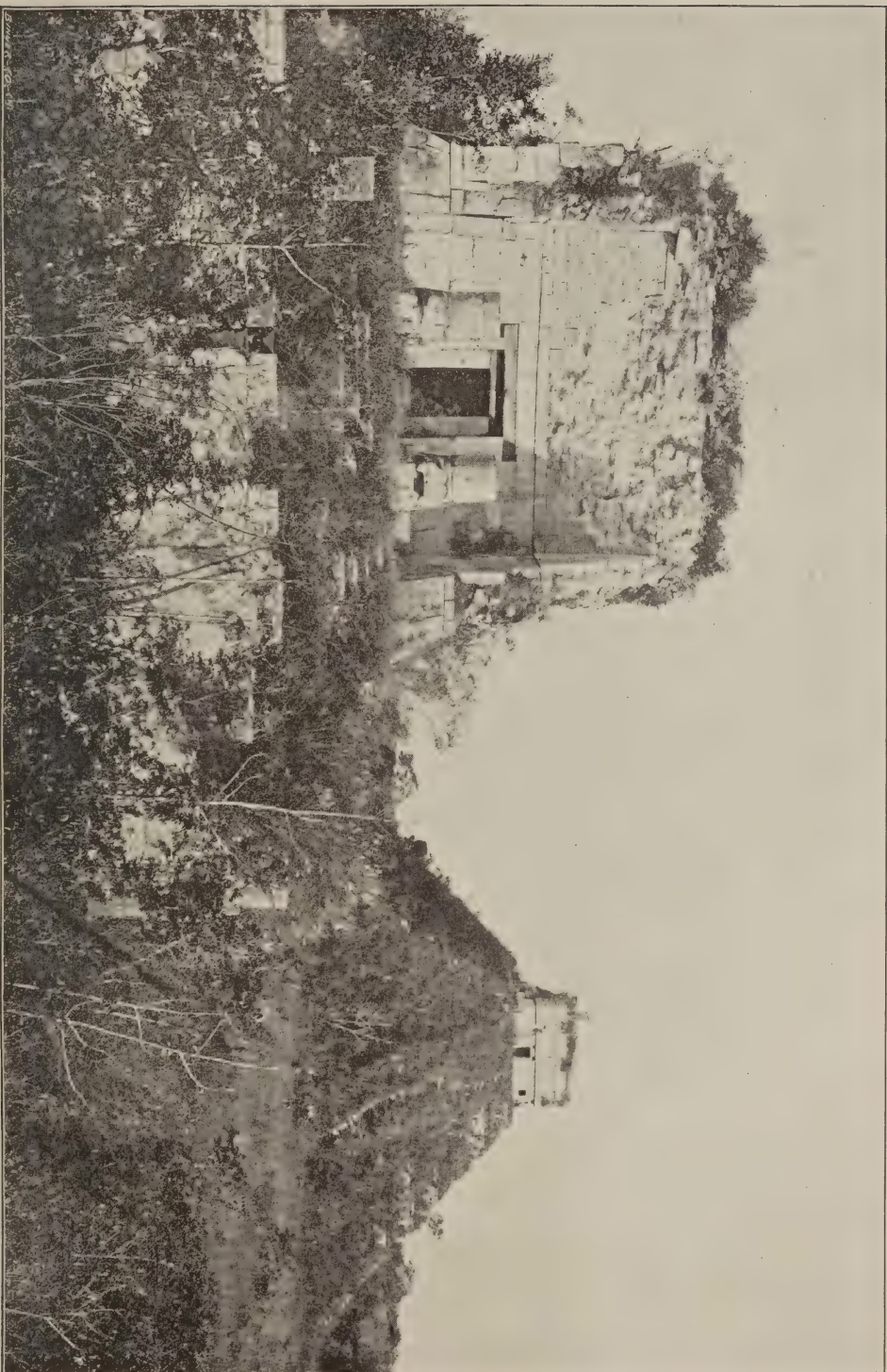
EL CASTILLO. We come now to the noblest monument of Chichen, the so-called Castillo or Castle, K, seen near the middle portion of the panorama rising grandly above the forest-covered plain. It is a pyramid-temple of the first order and bears testimony to the developing taste of the Itzas as well as to their capacity for designing and carrying out constructional enterprises of grand proportions. A distant view of this structure is given in Pl. XIII. It is perhaps as nearly a consistent unit of building, according to our estimate, as can be found in the Maya country, though there are still suggestions of lack of maturity and refinement. It embodies only two principal features, the square, terraced pyramid and the block-like superstructure. The pyramid is between seventy-five and eighty feet high and measures some 200 feet square at the base and about sixty feet square at the top. The stepped sides rise at an angle of fifty degrees. The stairways incline a few degrees less and hence project slightly beyond the pyramid at the base. The slopes rise in nine steps of eight or nine feet each, the terrace offsets being somewhat narrower. The rises incline inward a few degrees and are faced with well-hewn stone neatly laid in mortar and deeply paneled or coffered, thus diversifying an effect that would otherwise be extremely monotonous. The stairways, four in number*, assist also in breaking up the severity of the pyramidal mass. They are constructed of small blocks of roughly hewn stone, now much displaced in places.

The whole surface was probably evened up with plaster and finished in color. The temple fronts a few degrees east of north and

* I am not positive of the presence of a stairway on the east, as I failed to examine that side, but the probabilities are very strong that the four slopes of the pyramid are practically symmetrical.

PL. XIII. TEMPLE OF THE TIGERS AND EL CASTILLO.

This view is taken from the south end of the west wall of the gymnasium, looking east. In the foreground at the left is the solid mass of the east wall of the gymnasium supporting the ruined Temple of the Tigers. The plain hewn-stone wall is seen below, and rising from its margin to the temple level is the short stairway. The façade of the temple has disappeared save the lateral piers and the stumps of two great serpent columns which stood in the portal; the open mouths of the serpents, showing nostrils and bulbous fangs, face the observer. Back of the columns is the rear wall of the vestibule, with its characteristic masonry, and the doorway which leads to the pictured sanctuary. The end wall of the vestibule is seen at the right sloping to a point above, while one of the capstones of the vault is seen in place at the left. Beyond this temple at the right is the superb temple called El Castillo, 105 feet in height. The pyramid with its stairways, paneled terraces and neatly bound corners, is much obscured by vegetation. The west face of the temple, with its plain doorway and simple frieze and cornice, is clearly seen, but the north façade, in which occurs the wide main entrance and its fine serpent columns, is but imperfectly represented.



TEMPLE OF THE TIGERS AND EL CASTILLO.

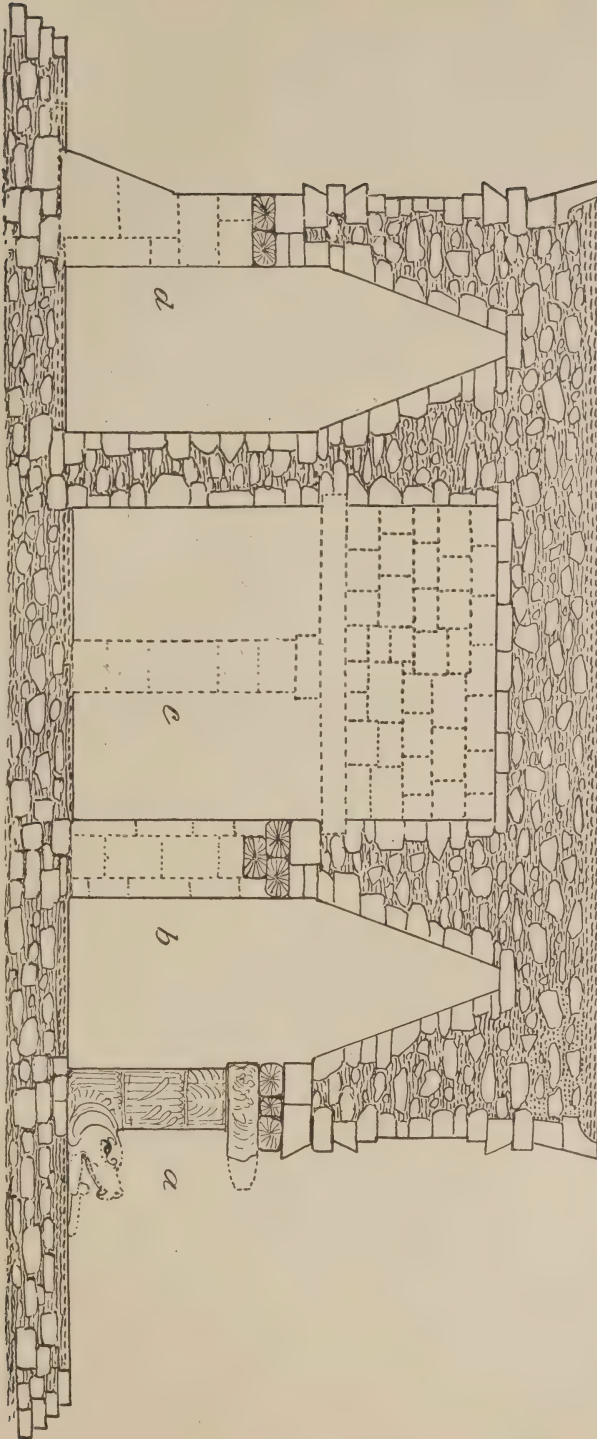


FIG. 35. SECTION OF THE TEMPLE CALLED EL CASTILLO, FROM NORTH TO SOUTH.

- a.* Serpent column at north or main entrance.
- b.* Vestibule with pilastered doorway leading to the sanctuary.
- c.* Sanctuary; square column, long wood beam and masonry of vault slope in dotted lines.
- d.* Outer gallery with doorway at left.

the stairway on that side is, according to Stephens, forty-four feet wide and contains ninety steps. The balustrades terminate below, as in other cases, in colossal serpents' heads. The serpent idea was carried out probably in the other stairways, and it is assumed also in the corners of the pyramid, on which may be seen, following in and out the nine terrace steps, the displaced stones that must have formed the colossal bodies. I counted ninety-two steps on the west side, and found the rises to average about eleven inches and the treads about ten inches. It is probable that there was a pretty close agreement in the principal features in all the flights, though the main front may have been favored with more elaborate sculptures.

The temple occupies the summit so completely that the esplanade is only about five feet wide on the west, south and east and from ten to twelve feet on the north front. The exterior wall measurements vary considerably with the level at which they are taken, as an incline at the base, four feet six inches high, with a batter of seventy-eight degrees, makes a difference of forty inches between the ground level measurement and that of the principal wall surfaces above. The walls are vertical, save the battered course referred to, and the height is twenty-five feet. A ground plan of the temple, with some details of chamber construction and small portions of the pyramid and its stairways, is given in Fig. 37.

The walls average a little less than three feet thick and are pierced by doorways on all four sides. The north entrance is twenty feet wide and is divided into three sections by two massive feathered-serpent columns. The other doors are plain and measure four feet six inches in width and six feet six inches in height. The main entrance leads into a vestibule extending the full length of the building east and west, and behind this a wide doorway gives entrance to a chamber, twelve feet seven inches wide by nineteen feet eight inches in length, in which stand two square columns supporting vault timbers. The other exterior doorways enter a corridor which extends along the south side and continues partially along the east and west sides.

It is desirable to describe this building somewhat in detail as it must, on account of its importance and excellent state of preservation, serve as a type of the Maya pyramid-temples. To avoid multiplication of words, however, I have prepared two sections which will at once convey a good notion of profiles and construction. The section from north to south, showing the façade on the right, is given in Fig. 35, and that from east to west is given in Fig. 36. In the first figure the profile of the north façade, partly restored, with its zapote lintels and rigid moldings, is seen at the right. The first

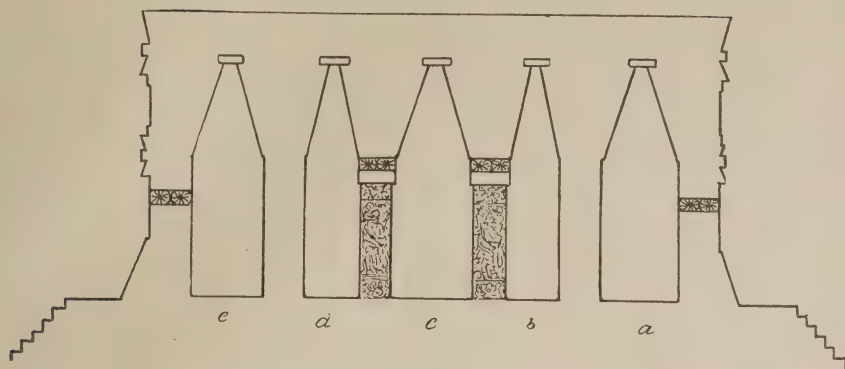


FIG. 36. SECTION OF EL CASTILLO FROM EAST TO WEST.

a and *e*. Outer gallery entered by east and west doorways.

b, *c*, *d*. Sanctuary with triple vault and ornamented columns.

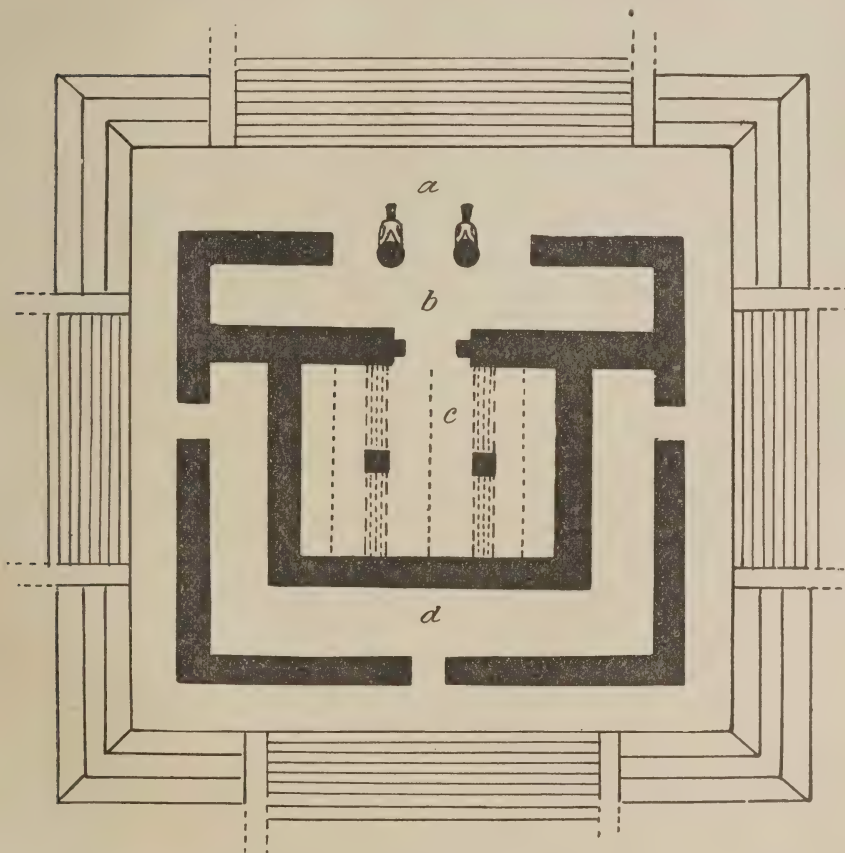


FIG. 37. PLAN OF TEMPLE AND UPPER PART OF PYRAMID OF EL CASTILLO.

a. North front with serpent columns in doorway.

b. Vestibule.

c. Sanctuary; dotted bands indicate position of wooden beams supporting vaults; dotted lines indicate apex of vaults.

d. Long gallery.

vault, *b*, is that of the vestibule, the second, *c*, that of the inner chamber, or sanctuary, cut lengthwise of the vault, and the vault *d*, is that of the south corridor. The inclined base of the exterior wall appears at the left. These arches all approximate eighteen feet in height leaving the roof mass above four, or possibly in places five feet thick. The other cross section shows the east arm of the long corridor vault at *a*, the triple vault of the inner chamber in the middle, *c*, and the west arm of the back corridor at *e*.

The façade is broken down over more than one-third of its area, mainly at the east end. The portal is entire, both columns, though much mutilated, being in place, and the three pairs of wooden lintels are intact, save the loss of one, or possibly two timbers from the east span. It is not likely that any novel or important architectural feature is lost, as the entablature decorations, which have entirely disappeared, probably duplicated those of the other façades. A good cut of the portal is given by Charnay, and I present another view in Pl. XIV.

The lower wall-zone is plain and is interrupted on the north by the front entrance, twenty feet wide and eight feet high, and on the south, east and west by doorways averaging about four feet six inches wide and seven feet six inches high. Fortunately nearly all the wooden lintels of this building are in place, but the fact that they are the weakest point in the construction is shown by the breaking out of considerable breaches above each of the doors where one or more beams have given way.

The upper wall-zone, separated from the lower by the heavy, rigid, triple-membered, medial molding, is treated in a very simple yet effective manner. It is only four feet ten inches wide, and contains three panels on each side, the outer ones being entirely plain, and the middle one of each set incloses a simply sculptured grotesque face, approximating the Palace masks, and doubtless referring to the same legendary conception or mythic personage or creature. The upper moldings are as usual, save that the coping member is exceptionally wide.

The inner chamber, usually referred to as the sanctuary, is remarkable for its triple vault and the symbolic relief sculpturings of its lintels, jambs, pilasters and square columns. These features have been illustrated by Stephens and Charnay, so that they need not be reviewed here in any considerable detail. This is the only perfectly preserved representative of its class in Chichen, but it is probably not as large or as elaborate as others of which we have distinct traces. Its ground plan and construction are well shown in the accompanying figures. Its most striking features are the vaults and

PL. XIV. MAIN PORTAL OF THE PYRAMID-TEMPLE CALLED EL CASTILLO.

At the right is seen the wall of cut stone with the inclined courses at the base; beyond is the portal, 20 feet wide by 8 feet high, divided by two massive feathered-serpent columns, the Indian boy leaning against the shaft of the nearer column. The serpent heads (base of column) are much battered, the jaw and cheek coil remaining in the farther example. The feather sculpture of the shaft is plainly seen and traces of the atlantean figures of the capital (tail of the serpent) are visible, though the outer ends are much mutilated. The wood lintels are well shown, the nearer set consisting of three timbers but slightly hewn; the middle set are well squared, and the farther are not seen, the inner one only being in place. The doorway leading to the sanctuary is seen behind. The façade moldings are partially in place above the lintels, but the end of the wall beyond is much broken down.



MAIN PORTAL, TEMPLE OF EL CASTILLO.

the two columns that support the pendant septæ of the triple soffit. The columns and the heavy timbers resting upon them are well shown by Stephens, and a reference to my sections will make the relation of these features to the vaults sufficiently clear.

The walls are of plain masonry, but the jambs and pilasters of the doorway, and the columns, are entirely covered with relief sculptures. The main subject employed is a human figure of full life-size, which is treated in a rather crude way, and occupies the middle portion of each of the narrow upright spaces, of which there are ten in the doorway and eight on the columns. This figure is elaborately costumed, but seems to have a priestly rather than a warlike character, judging by the action and the accompanying paraphernalia. One or two of the figures are remarkable from the fact that they have long beards; others have death's heads.

The narrow spaces over the heads and beneath the feet of the principal figures are filled, in the main, with dwarfish figures of whiskered Atlantes represented as supporting the parts above them. A few have death's heads, and some of the spaces are filled with grotesque masks or faces in relief, which would seem to embody the same conception as the great mosaic masks of the façades. All of these designs are repeated in several other sanctuaries.

BALL COURT OR GYMNASIUM. A little to the left of El Castillo, in the panorama, is the Tennis Court or Gymnasium. It is briefly described by Stephens and other explorers, and Mr. Thompson will no doubt work it out in all its interesting details, so that a sketch only need be presented here. This group consists of four structures independently placed, but practically inclosing an oblong rectangular space or court, which is about 450 feet long and 120 feet wide. The ground plan is indicated on the accompanying map, Pl. XVII.

The lateral structures—on the east and west sides—are primarily colossal walls 275 feet long, thirty-four feet thick and twenty-five feet in height. They are faced with hewn stone, and hold a significant relation with each other and with the court, as indicated by the placement of two great stone rings, set firmly in the walls by means of tenons at opposite points near the middle and at an elevation of some eighteen or twenty feet above the ground; the one on the east side only remains. These rings, as described by Stephens, are four feet in diameter and thirteen inches thick, and are pierced by an opening nineteen inches in diameter. It is believed that they served some function in connection with the game of ball, of which the Mayas, as well as other native tribes, were extremely fond. The annular faces, vertically placed, are decorated with intertwined serpents in low relief, the heads meeting above.

The western wall appears to be without decoration or other feature of particular interest, save the ring socket, and no stairway was observed. The eastern wall has associated with it the remains of two temples, which must have been among the most elaborate and interesting structures in Chichen. Near the south end the wall is enlarged on the east side into a terrace some forty feet square and four or five feet higher than the wall, and upon this stands a two-apartment temple, while a single-room temple was placed against the terrace at the east base. The section given in Fig. 38 and the plan, Fig. 39, will serve to show the peculiar relations of walls, temples and terrace, though the time given to the study of this ruin was too limited to permit a satisfactory analysis.

Although the lower temple is in an advanced state of ruin—the front, the roof and parts of the ends being destroyed, as indicated in the section—the back wall is preserved to the apex of the arch, and large parts of the end walls are in place. These walls, the remnants of square columns, and the antæ fronts, are covered with relief sculptures; those upon the walls represent, in the main, processions of elaborately costumed figures with associated symbolic devices, while those on the columns and jambs nearly duplicate the jamb and column sculptures of El Castillo. Nearly all the mural figures still retain distinct traces of the brilliant colors in which they were originally finished. They evidently represent the participants in a ceremony or dance, which was probably of a warlike nature. This latter suggestion is warranted by the carrying of weapons by the personages represented, by the association of the tiger and the shield with the decorations of the edifice, and by the battle-scene frescoes of the upper temple. Between the columns, as seen in the photograph reproduced in Pl. XV, is the figure of a tiger, rigid in pose, which may have had symbolic associations with the temple or may have served merely as a seat.

The ruin of the upper temple is a very considerable pile which retains large parts of the east, north and south walls; the front apartment or vestibule on the west is in about the same state of ruin as the single chamber of the lower temple. It stands upon a platform four or five feet higher than the gymnasium wall, and occupies nearly the entire space, save on the front which has a platform six or eight feet wide. It is probable that the roof of the lower temple was on a level with the top of the wall. No stairway has been located, though there are five or six steps leading down from the front of the temple to the edge of the wall facing the court. There may have been a flying stairway descending from this point connected with the top of the wall by wooden or stone beams, though so

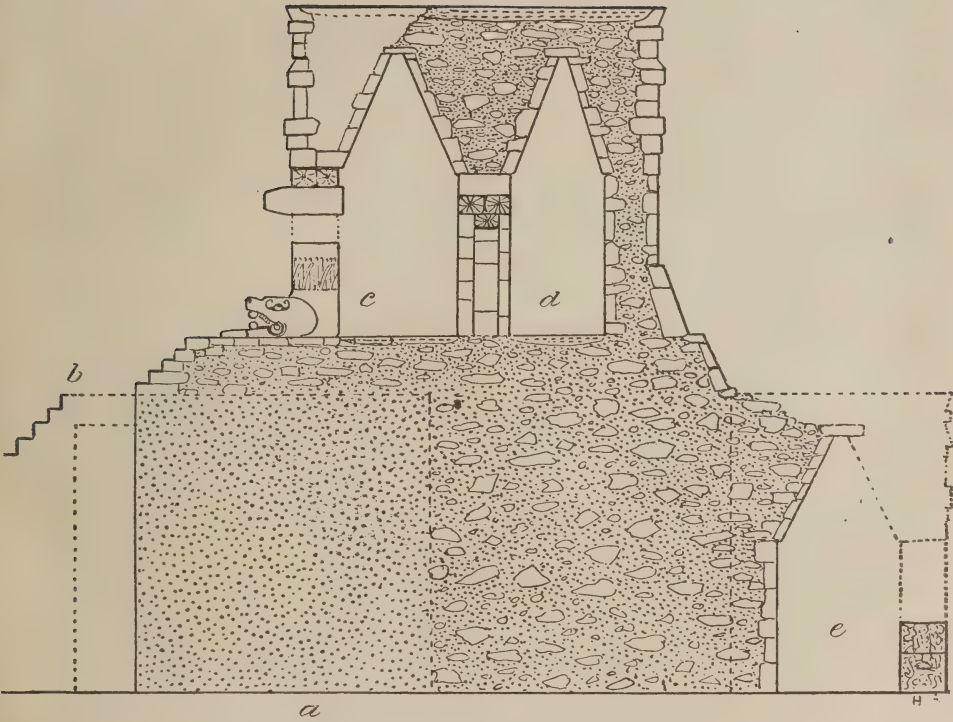


FIG. 38. SECTION OF TEMPLE OF TIGERS, SHOWING UNIQUE ENTABLATURE PROFILE.

Façade of upper structure and front face of vestibule vault above the middle of the column are restored. The lines should have been uniformly dotted. Façade of lower structure may not have occurred as here indicated, for there is a possibility that other chambers existed to the right of this.

- a.* Section of Gymnasium wall—dotted area.
- b.* Hypothetic continuation of stairway.
- c.* Serpent column and outer chamber or vestibule.
- d.* Sanctuary, entered by pilastered doorway with three wooden lintels.
- e.* Lower Temple, with sculptured columns and walls.

far as I could see, there are no traces of their insertion, and there is no debris below. It may be imagined that such a flight would have interfered with the use of the court as a playground. Of course a stairway could have approached by way of the wall from the east side, either north or south of the temple. The rear corners of the substructure sloped at a high angle, and were finished with rows of large stones rounded on the outer face and possibly intended to represent the bodies of serpents.

The façade of this building was some thirty-five feet long and twenty-two feet high, and is now represented by the bases of two huge feathered-serpent columns—which separated the wide portal into three parts—and remnants of the two lateral pillars or antæ fronts seen at the right and left, Pl. XIII. The columns correspond closely with those of El Castillo, but were larger and probably considerably taller. Both sets are referred to in the introductory pages and illustrated in the frontispiece. I have assumed, as indicated in the section, that the columns in this, as in other cases, supported zapote lintels. The façade rose above to the coping, and no doubt contained features corresponding closely with those of the other walls of the building.

We have here the first case observed in which the lower and upper wall spaces are not well differentiated, and the peculiar rigid moldings are absent. Beginning with the floor level, the wall rises five feet ten inches—in two or three courses of large stones—with a batter or incline of sixty degrees from the horizontal; the course above this, ten inches wide, slopes in at a still lower angle, Fig. 38. Above this is a paneled zone about four feet wide, the panels, two to a side, being shallow and peculiarly varied by facing certain minor planes at somewhat different angles. Above the panels come two slightly projecting courses, the upper decorated its entire length with chaste guilloche work in low relief. Next is a wider course set a little back and decorated with ornamented shield disks three to a side, alternating with well-sculptured tigers in low relief, arranged in four pairs. On the south side two pairs of the tigers at the right face to the right, and two at the left face to the left. All are in the act of walking. Apron-like pendants extend from the shield disks down over the subjacent courses. Next is a slightly projecting course corresponding to that below the tiger zone, and above this again is a narrower, inward-sloping course. Resting on this is another course set forward in the middle portion to form the base for a baluster-like ornament, some twenty feet long, occupying the middle part of the next course. This lower course and the outer ends of that above are embellished with handsome conventional reliefs. The same may be said of the next course which projects a little forward again forming

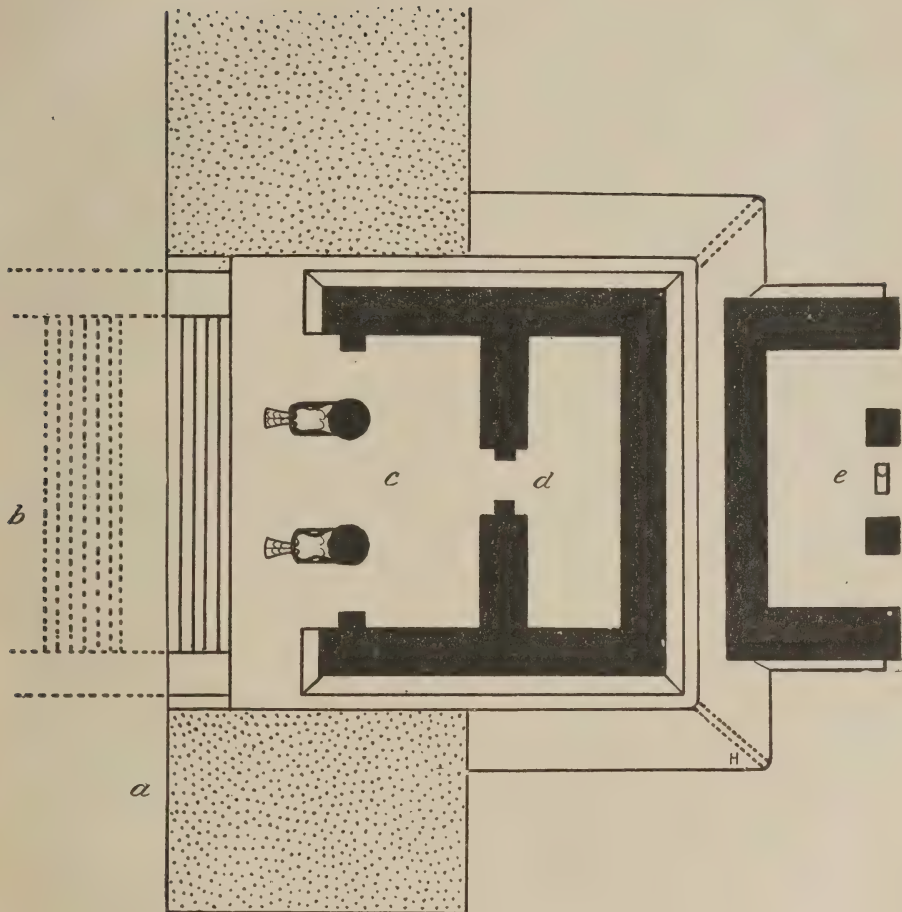


FIG. 39. PLAN OF TEMPLE OF TIGERS, GYMNASIUM GROUP

- a.* South end of gymnasium wall.
- b.* Hypothetic position of stairway.
- c.* Columns and Vestibule of upper temple.
- d.* Sanctuary; walls, covered with paintings.
- e.* Lower temple, with square columns and sculptured tiger between.

a cap for the baluster panel, and supporting the coping course which is wide and projects forward as usual, Fig. 38.

The serpent columns occupying the western portal, still stand to the height of six or seven feet, and are elaborately sculptured to represent scales, feathers and other features. The eyeballs were formed of white sea-shell. The heads are massive and formed of a single stone, save the tongues, now lost, which were set into the end of the lower jaw by means of a tenon. The fangs in this case are large and bulbous. The end and back walls, and the expansive inner surface of the vestibule arch behind these columns, are well preserved, and faced with accurately dressed stones of rather large size. Most of the surface is now weathered quite clean, but originally it was painted and pictured, traces of the work remaining in several places.

Unlike the Castillo portal this entrance extends the full width of the building, save for the square pilasters set against the lateral walls near the front, and approximates the portico more closely than any other Maya propylæum. The appearance and relations of the antæ are sufficiently indicated in the ground plan and in plate XIII. The pilasters, which stand opposite the serpent columns, supported the outer ends of the wooden lintels, and like the jambs of the fine doorway leading to the back chamber, are handsomely sculptured with human figures in low relief. The lintel beams of the doorway, three in number, and set as indicated in the section, are covered with well executed glyphs. The back chamber is of the usual style and is noted for its elaborate mural paintings, described by Stephens and studied and copied by Thompson. The entire wall-space has been covered with these designs, but the remnants left are not sufficient to give a clear notion of the work. There are traces of borders of colored lines and bands, but the great spaces were filled in with pictorial subjects, hardly to be classed as decorations, as they were apparently without order or systematic arrangement.

The only extended subject at all well preserved is a battle scene with numerous warriors engaged in combat. The figures are scattered over a large area in a somewhat hap-hazard way, and in the background is a village with buildings suggesting the columned temples, and with men and women variously engaged. The figures are drawn in clean, free outlines in a dark color, and filled in with flat colors which include white, black, yellow, blue, green, and red. A reddish brown was used as a flesh color, and the figures were drawn complete and nude before the costumes were added.

The action of the warriors is varied and strong, having a good deal of the fresh vigor of a sketch, but the work is hardly equal to the

PL. XV. SCULPTURED SANCTUARY OR CHAMBER, TEMPLE OF THE TIGERS.

This chamber, noted for its superb wall sculptures, is placed against the east base of the pyramid upon which rests the main Temple of the Tigers, south end of the eastern gymnasium wall. All that remains is a large part of the back wall, about half of the sloped soffit space above, the end wall at the right, part of the end wall at the left—against which the Indian boy leans—and the remnants of two square sculptured columns in front. It is generally assumed that this chamber stood alone and that the entire front was open save for the square columns, but possibly this is only the inner section of a triple-vaulted sanctuary, as in El Castillo, the front portion and the vestibule (or other entrance way) having been wholly destroyed.

The sculptures, which cover the walls, represent richly bedecked figures arranged as if to represent some ceremony or dance, and most of them still retain distinct traces of the brilliant colors with which they were originally embellished. The sculptures covering the columns are nearly identical with square-column decorations in other temples. The figure of a man occupied the front of the left hand column and that of a woman—as indicated by the plaid skirt—the right hand column. Between the columns stands the rather rudely sculptured and very formal figure of a tiger. This may not have been its original position. Length of the chamber, 22 feet; width, 10 feet; height, 15 feet.

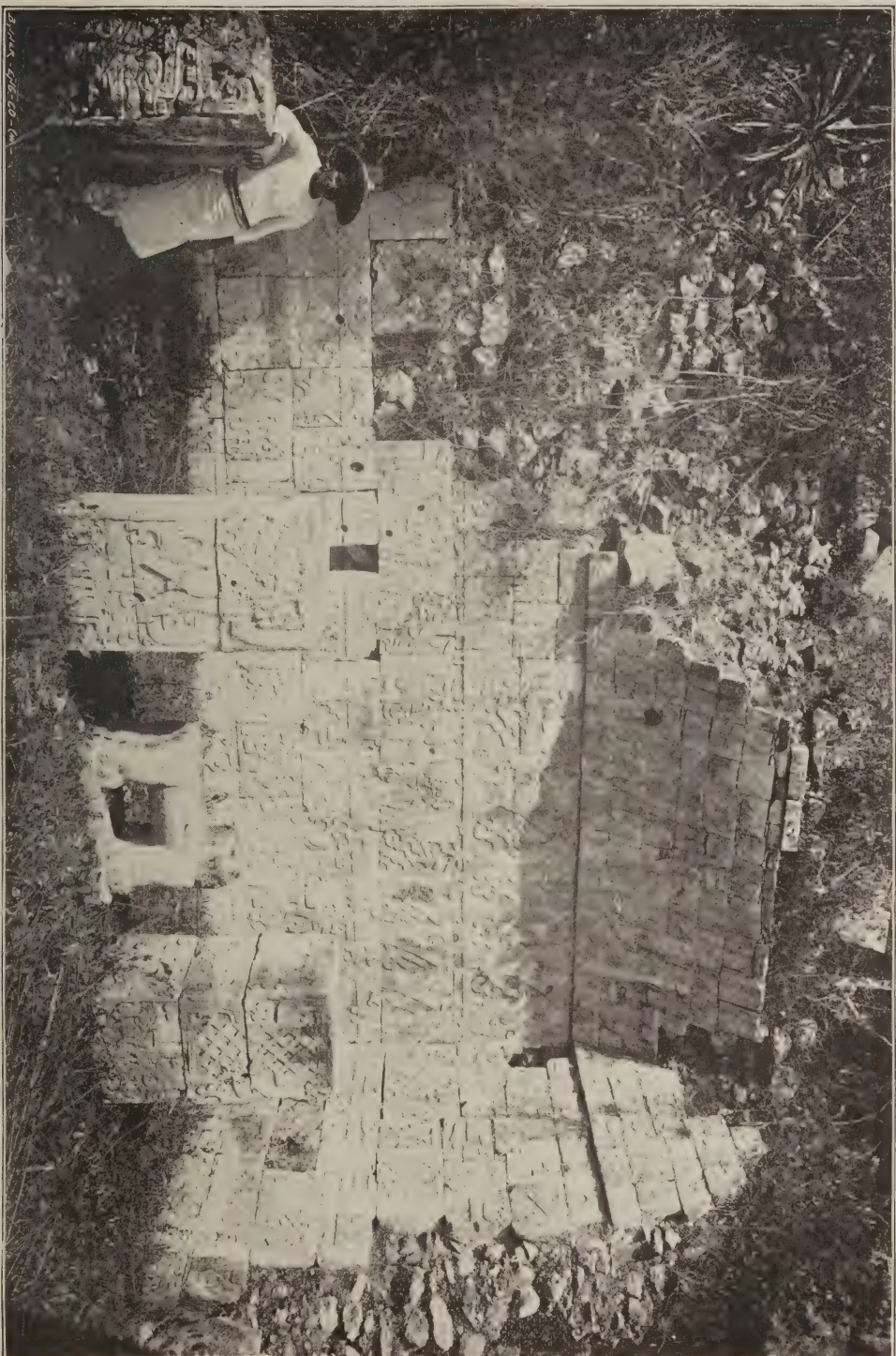


PLATE XV. C. 6.

SCULPTURED SANCTUARY, TEMPLE OF THE TIGERS.

best work of the codices, and perhaps hardly up to the grade of art to be expected of a people capable of designing and erecting the remarkable buildings of Chichen.

The small buildings facing the court at the north and south ends call for a mere mention only. That on the north is a small pyramid-temple, having a single chamber and round columns now in a ruined state. That at the south end was much larger, but is in a very advanced state of demolition. Both are shown in the panorama.

TEMPLE OF THE CONES. A few rods directly north of El Castillo, and imperfectly shown in the panorama, is a pyramid-temple of considerable importance, but one to which I was unable to give particular attention. It is, however, so completely ruined that little can be determined with respect to its character without extensive excavation. It has been embellished with a frieze (probably) of diminutive cone-shaped columns. Associated with it are several pieces of sculpture, including handsome slabs with subjects in bas relief, and a "Chacmool" of the well-known Le Plongeon type.

GROUP OF THE COLUMNS. To the right of El Castillo in the panorama is one of the most important clusters of remains in Chichen. It has been but little explored and remains a treasury of interesting data for some future explorer. A great irregular squarish space, some 500 or 600 feet in extent, is bordered by the ruins of pyramids and buildings of greatly varied characters. At the north are two considerable pyramids, at the south are two or three more and on the east are several others involved with terraces and coalescent piles of unusual conformation. The largest pyramid stands on the outside of the northwest corner of the inclosure, and is nearly 100 feet square and some fifty feet high. It probably supported a temple and was faced with hewn stone, but is now hardly more than a mound of broken-down masonry.

TEMPLE OF THE TABLES. Beyond the mound just referred to is a smaller pile about twenty-five feet high, upon which are now exposed, through the labors of some enterprising explorer, the remains of a superb temple, hardly surpassed in interest by any other in the city. The main façade seems to have been to the west and is represented now by its stairway, its fallen serpent columns and sculptured lateral walls, not yet fully freed from the mass of debris. The appearance of the fallen column on the north is roughly indicated in the accompanying sketch, Fig. 40, which shows the broken head nearly five feet long, the protruding sculptured tongue, two feet long, a round shaft section twenty-three inches in diameter, and the upper section of the shaft terminating in the serpent's tail which is five feet long, and turned outward forming the capital. This latter

section of the column is peculiar in being square. The whole height of the column, if the parts really belong together, was ten or eleven feet.

Behind the columns was a vestibule, probably of the usual type, from which a doorway, with square sculptured jamb-piers, opens through into a rear apartment of imperfectly defined characters, but exhibiting features of unusual interest. The floor space is about fifteen by thirty-six feet in extent, the inner wall, and very small portions of what may have been end walls, remain. Ranged along the middle of the space from north to south are the remains of four square columns, Pl. XVI, built of large stones and handsomely embellished over the entire surface with figures and devices in low relief, such as are seen in El Castillo and elsewhere. They are nearly nine feet high and measure twenty-three inches square; they undoubtedly supported zapote beams and the usual arched ceilings. This chamber was probably the sanctuary, as it corresponds to this feature in El Castillo and other temples.

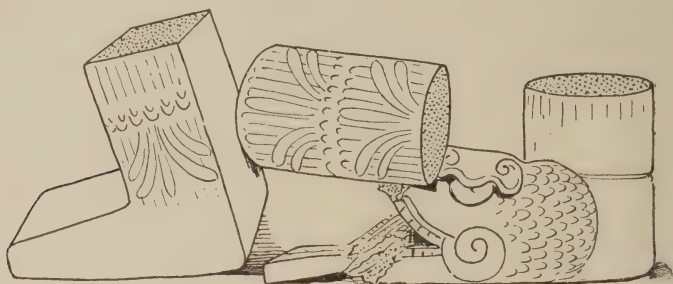


FIG. 40. SKETCH OF FEATHERED-SERPENT COLUMN

Façade of Temple of the Tables; ornamentation imperfectly recorded.

The most extraordinary feature, however, connected with this temple is a series of accurately cut limestone tablets held up by human figures of caryatid-atlantean type thirty inches high, and ranged along the outer edge of the floor space on the margin of the terrace. The tablets are of varying dimensions, averaging perhaps three feet square and five or six inches thick. They appear to have been placed to form a continuous table the entire length of the building, each slab having been supported by two of the figures, as shown in Fig. 41. These slabs are wonderfully resonant, and when struck lightly with a hammer or stone, give out tones closely resembling those of a deeply resonant bell, and the echoes awakened in the silent forest are exceedingly impressive. The dwarfish figures are well sculptured in elaborate costumes, and stand with both hands aloft, giving a broad surface for supporting the slabs. All have been taste-

PL. XVI. SQUARE COLUMNS, TEMPLE OF THE TABLES.

Four of these handsomely sculptured, square columns are ranged across the eastern platform of the pyramid, and, judging by analogy, were employed to support the vault timbers of the sanctuary. They are nearly identical in their sculptures with square columns in the sanctuary of El Castillo, and correspond closely with the square, sanctuary columns of several other temples. At the top are bearded, atlantean figures in the position of supporting the entablature or beams; at the base are similar sculptures, not clearly made out; and occupying the middle spaces, one to each side, are life sized, elaborately costumed figures of men in low relief. The height is 9 feet and the horizontal measurement about 25 inches. With the columns are shown several of the pigmy atlantean figures used as supports for stone tables ranged around the margin of the terrace, as if originally placed against the back wall of the sanctuary. They are now much displaced, and in the view one is so placed as to show the graceful drapery of the back.



SQUARE COLUMNS, TEMPLE OF THE TABLES.

fully finished in bright colors. Two or three sets of similar figures are found in the adjoining ruins.

QUADRANGLE OF THE COLUMNS. In the panoramic view the great inclosure of the columns is too distant to be indicated clearly. Beginning at the northwest corner, one range of buildings, represented by a rough surfaced flattish ridge some sixty feet wide and perhaps 400 feet long, extends to the eastward from the large pyramid. It is characterized by its multitude of short columns, square towards the west end, where there was apparently a temple of usual type, and round to the east, where they stand in close order over a large part of the ruin. There can be little doubt that these columns belonged to an extensive building and were connected by wooden beams which extended from column to column over the entire

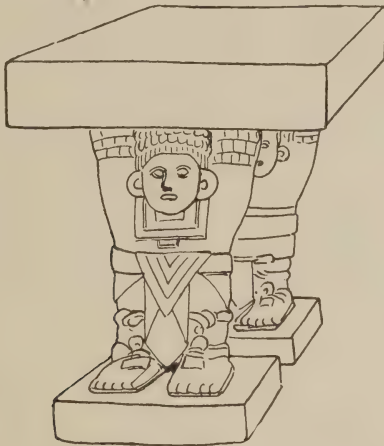


FIG. 41. STONE TABLET SUPPORTED BY TWO ATLANTIAN FIGURES.
Whole height 40 inches.

area supporting the roof timbers, or masonry, and affording a covered space of large extent and unique appearance. It would seem from some slight excavations made in the mass, that a considerable range of vaulted apartments is buried beneath the debris.

North of this pile are ridges of debris of unknown extent buried in deep forest, and toward the east the line is connected by a low, narrow ridge, also showing columns, with a ruined mass upwards of 100 feet long, forty feet wide and twenty-five feet high, which extends to the southward. From the center of the latter there branches off to the east a low mass approximating sixty feet wide and a hundred feet long, covered with remnants of large square columns; and from the south end another range with columns extends to the east and connects with still another north and south range

100 feet or more in length. The latter joins the north slope of a pyramid upon which formerly stood a typical temple of large size with square columns, remnants of which remain, while numerous interesting caryatid-atlantean figures occur in the debris. This pyramid is perhaps sixty by 100 feet in horizontal extent and forty-five or fifty feet in height; other piles of inferior dimensions occur to the south and east.

The ranges of ruins on the west and south side of this great enclosure are of less importance and do not require description here. They terminate in two or three small mounds at the southwest angle, from one of which stone is being taken for the burning of lime.

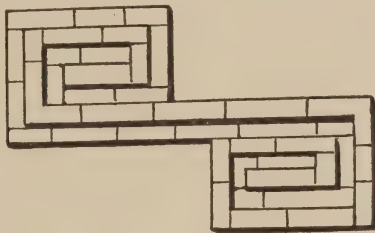
More or less definite reference has now been made to something like thirty ruined structures, over half of which are of the pyramid-temple type. If these were really temples, and not merely the dwellings of the more ambitious citizens or great caciques, we have a striking illustration of the importance of sacerdotal customs among the Mayas, and a clear indication of the great importance and extent of Chichen in the days of its prosperity.

CENOTES. It remains to point out in the panorama the two remaining features of importance, the Cenote Grande near the center of the picture, **M**, and the Sacred Cenote, **N**, away off towards the horizon beyond the Gymnasium court. The former was probably a chief source of the supply of water that made the development of Chichen possible, and the imagination is wont to picture the trains of tireless carriers moving, almost without ceasing, up and down the steep pathway and back and forth in the city. This great well is some seventy feet deep and averages perhaps 150 feet in diameter. It had its origin, no doubt, in the caving in of the roof of a subterranean waterway, the orifice enlarging by breaking down at the sides until the walls reached the vertical and in places passed beyond it. Progress was made, not so much by the falling in of undermined masses as by the mere crumbling of the surface, particle after particle falling from the wall to be dissolved or carried away. As the limestones are massively bedded and quite homogeneous in texture, the surfaces were probably always nearly as even and smooth as they appear today. Disintegration took place somewhat equally all around, giving rise to the circular form which is so pronounced that many people regard the cenotes as works of art. The pool which rests calmly at the bottom of the pit is shallow at the side next the steep pathway where the walls are most broken down, but in the center and against the perpendicular wall is of unknown depth. The water is at present sufficiently pure to serve for drinking and culinary purposes; but its taste is naturally affected by the vast accumulation of vegetable

matter swept into the gaping orifice each year. No current is perceptible and if there is any connection with a subterranean stream it is by seepage merely, the erosive agencies not being sufficiently active to clear away the accumulation of debris descending from above.

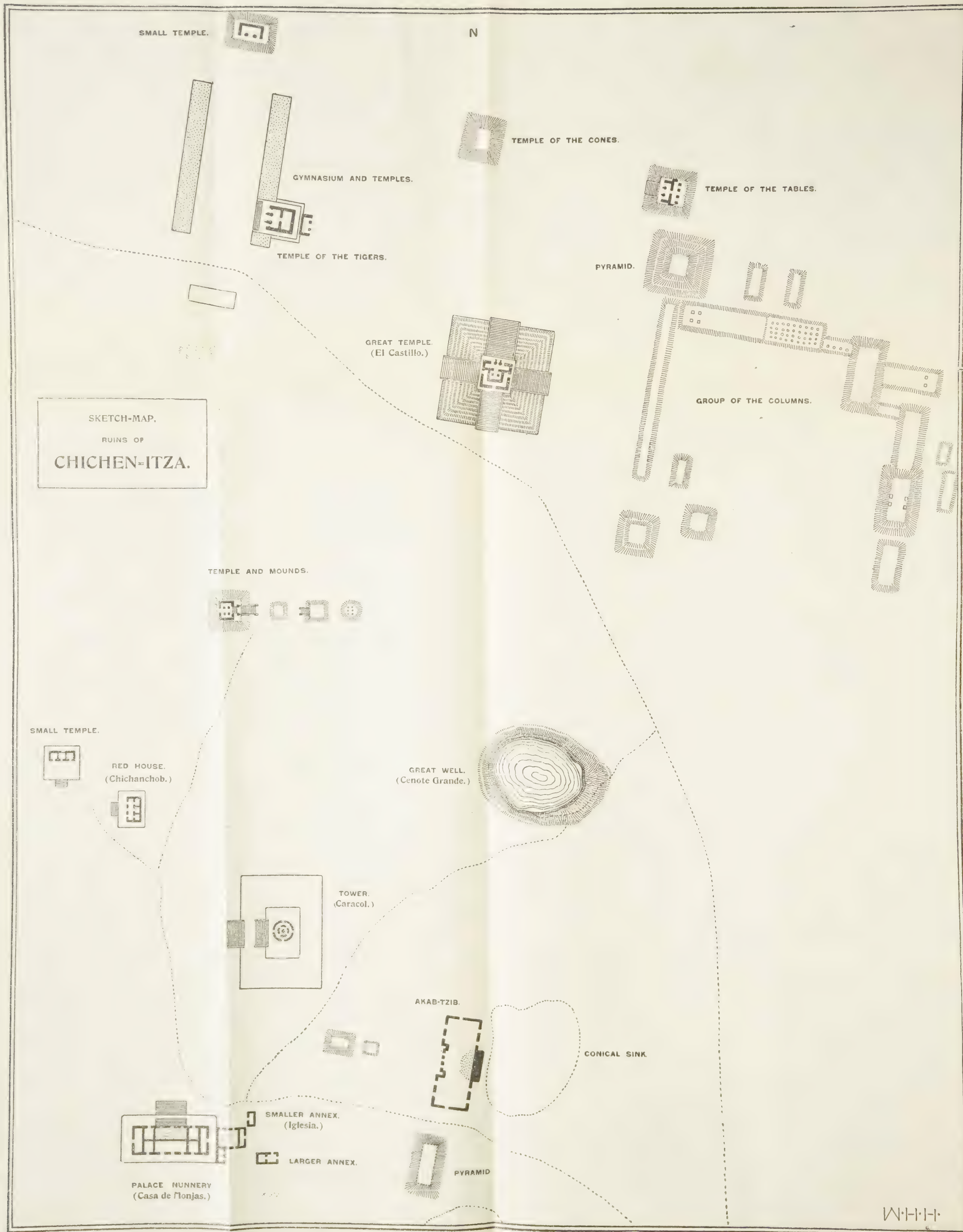
The Sacred Cenote is larger, and more symmetrical than the other, and, occurring in the midst of the somber forest, is a most impressive and awe-inspiring spectacle. Its charm is enhanced by the weird stories of human sacrifice associated correctly or incorrectly with its history. The walls are nearly circular and approach the perpendicular closely all around. They are diversified only by the encircling ribs and pitted grooves produced by the uneven weathering of the massive, horizontally-bedded limestones. The water has a light coffee color and looks very impure. It is shallow on one side and of unknown depth on the other. A small tomb-like ruin is perched upon the brink. It is conjectured that this structure had something to do with the ceremonies attending the casting of victims and treasure into the terrible pool.

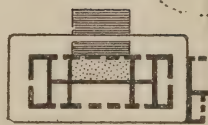
There has been some talk of exploring the accumulations forming the bottom of this cenote with the expectation of securing works of art or other treasures, but the task is a most formidable one and will require the erection of strong windlasses and efficient dredging apparatus. It is doubtful if promised results warrant the outlay necessary for carrying out the work in a thorough manner.



MOSAIC FRET, UXMAL.

Length, eight feet.



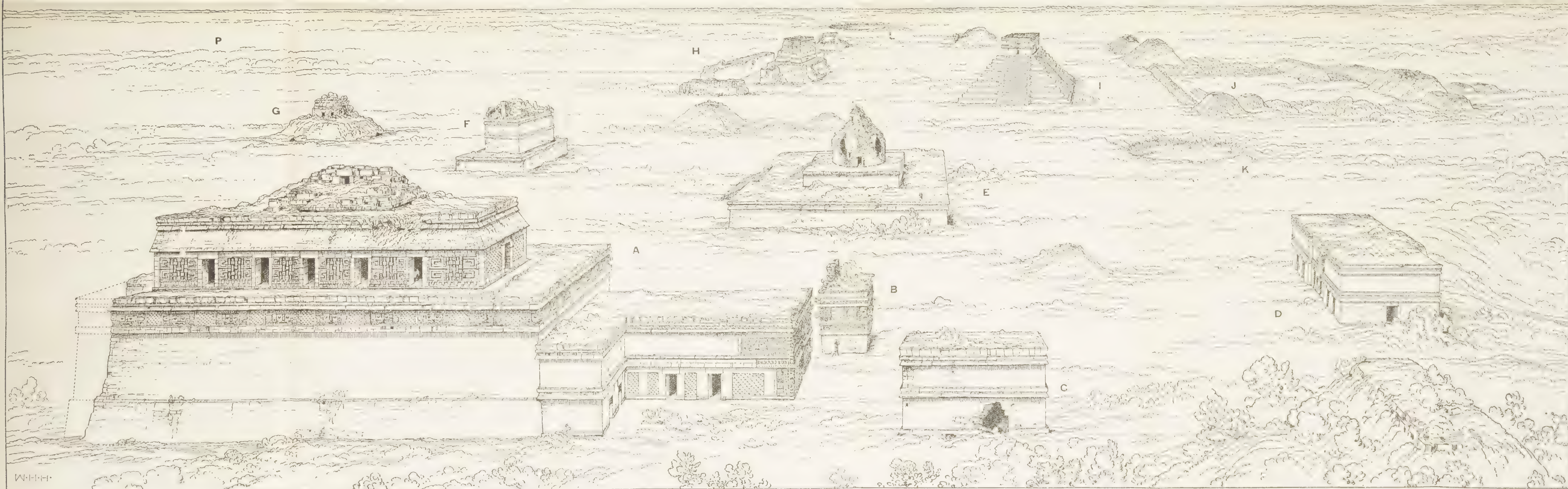


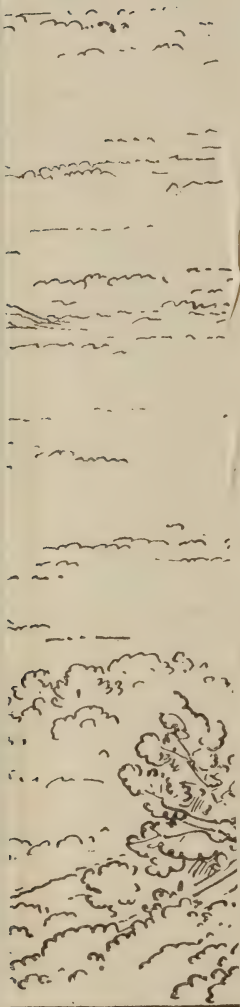
PALACE NUNNERY
(Casa de l'onjas.)

W·H·H·

N

PANORAMA OF CHICHEN-ITZA.





FIELD COLUMBIAN MUSEUM

PUBLICATION 16

ANTHROPOLOGICAL SERIES.

VOL. I, NO. I.

ARCHEOLOGICAL STUDIES

AMONG THE ANCIENT

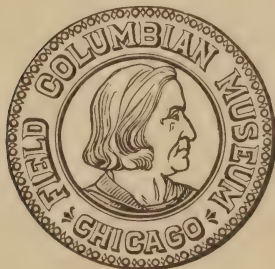
CITIES OF MEXICO

BY

WILLIAM H. HOLMES,

Curator, Department of Anthropology.

PART II, MONUMENTS OF CHIAPAS, OAXACA AND
THE VALLEY OF MEXICO.



CHICAGO, U. S. A.

February, 1897.

ARCHEOLOGICAL STUDIES
AMONG THE
ANCIENT CITIES OF MEXICO.

BY WILLIAM H. HOLMES.

PART II.

CONTENTS, PART II.

	PAGE
Prefatory note, - - - - -	149
Ruins of Chiapas, - - - - -	151
Palenque, - - - - -	151
Introductory, - - - - -	151
Panoramic View, - - - - -	153
Orientation and assemblage, - - - - -	154
Materials and masonry, - - - - -	155
Construction, - - - - -	157
Substructures, - - - - -	157
Superstructures, - - - - -	158
Ground plan, - - - - -	158
Profile and construction, - - - - -	160
Doorways, - - - - -	162
Pillars, - - - - -	163
Sculpture, - - - - -	164
Stucco work, - - - - -	166
Color, - - - - -	167
Implements, - - - - -	168
Stairways, - - - - -	168
The Palace group, - - - - -	169
The pyramid, - - - - -	169
The buildings, A to M, - - - - -	171
Temple of the Inscriptions, - - - - -	186
Temple of the Beau Relief, - - - - -	188
East-side remains, - - - - -	191
Temple of the Sun, - - - - -	192
Temple of the Cross, - - - - -	199
Temple of the Cerro, - - - - -	202
The subterranean waterway, - - - - -	203
The bridge, - - - - -	205
Tombs, - - - - -	206
Calcareous deposits, - - - - -	208
Ruins of Oaxaca, - - - - -	210
Introductory, - - - - -	210
Ruins of the Lesser Alban, - - - - -	211
Ruins of Monte Alban, - - - - -	212
Ruins of Mitla, - - - - -	227
The journey, - - - - -	227
Modern Mitla, - - - - -	227
The ancient remains, - - - - -	229
Panoramic view, - - - - -	230
Orientation and assemblage, - - - - -	231
Building materials, - - - - -	231
Masonry - - - - -	233
Substructures, - - - - -	234

	PAGE
Superstructures,	235
The ground plan,	236
Profile and construction,	237
Doorways,	240
Columns,	243
Roof construction,	244
Mural embellishment,	245
Sculpture,	245
Mural mosaic work	246
Plaster, cement,	251
Painting,	252
Painted designs,	252
Group of the Catholic Establishment,	255
Group of the Columns,	257
Quadrangle of the Columns,	257
Hall of the Six Columns,	259
Quadrangle of the Grecques,	262
Quadrangle of the Basement Galleries,	267
Group of the Arroyo,	272
Group of the Adobes,	273
South-side Group,	274
The Fortified Hill,	275
Quarrying and cutting stone,	279
Flaked stone implements,	285
Copper implements,	287
Pottery,	288
Ruins of the Valley of Mexico,	289
San Juan Teotihuacan,	289
Rank of the city,	289
History and people,	289
Location and plan,	290
Substructures,	291
Superstructures,	291
Sculpture,	293
Pottery,	293
Painting,	293
Literature and exploration,	293
Panoramic view,	294
Pyramid of the Moon,	294
Court of the Battered Goddess,	295
Camino de los Muertos,	298
The South Side Group or Citadel,	297
Tenochtitlan,	298
Studies of Ancient Mexican sculpture,	301
Onyx tablet with engraved figure of a deity,	304
Sculptured yokes,	309
Cylinder with serpents in relief,	321
Annular stone with reliefs,	322
Stone box with reliefs,	322
Head of diorite,	323
Feathered serpent in greenstone,	324
Carved shells,	326

ILLUSTRATIONS, PART II.

PLATE.	Opposite page.
XIX. View in northwest court of Palace showing decorated piers and towers, - - - - -	176
XX. Stucco altar-piece known as the Beau Relief, - - - - -	190
XXI. Temple of the Sun, from the east, - - - - -	196
XXII. Sanctuary tablet with sculptures in low relief, - - - - -	202
XXIII. Articles from a tomb in the side of the pyramid of the Tem- ple of the Cross, - - - - -	206
XXIV. Sketch map of Palenque, - - - - -	208
XXV. Panoramic view of Palenque, - - - - -	208
XXVI. Panoramic view of Monte Alban from the Lesser Alban, - - - - -	226
XXVII. Panoramic view of summit remains, Monte Alban, - - - - -	226
XXVIII. Sketch map of summit remains of Monte Alban, - - - - -	226
XXIX. Mitlan women spinning and weaving, - - - - -	228
XXX. Relation of mosaic patterns to the mosaic stones, - - - - -	246
XXXI. Façade of Hall of the Six Columns, - - - - -	258
XXXII. Interior of Hall of the Six Columns from above, - - - - -	260
XXXIII. Court and east chamber of the Quadrangle of the Grecques, - - - - -	262
XXXIV. In the court of the Quadrangle of the Grecques, - - - - -	264
XXXV. Section and perspective of the west chamber of the Grecques, - - - - -	266
XXXVI. Basement galleries and columnar roof support, - - - - -	270
XXXVII. The Fortified Hill; eastern walls as seen from without, - - - - -	278
XXXVIII. Panoramic view of Mitla, - - - - -	278
XXXIX. Sketch map of the ruins of Mitla, - - - - -	278
XL. Stone pick used in quarrying stone, - - - - -	284
XLI. Hammerstone and celt found in a Mitlan quarry, - - - - -	284
XLII. Flint cores from which flakes have been struck off, - - - - -	286
XLIII. Flint flakes and scrapers from Mitla, - - - - -	286
XLIV. Hammerstones from Mitla, - - - - -	286
XLV. Flint rejectage of blade-making from a shop near Mitla, - - - - -	288
XLVI. Foundations exposed by Charnay's excavations in Teotihuacan, - - - - -	292
XLVII. San Juan Teotihuacan from the Pyramid of the Moon, - - - - -	294
XLVIII. View looking east along the Pathway of the Dead, - - - - -	296
XLIX. Panoramic view of San Juan Teotihuacan, - - - - -	298
L. Onyx tablet with engraved figure of a deity, - - - - -	306
LI. Stone yoke carved to represent the frog, - - - - -	310
LII. Four views of a sculptured yoke from Motzorongo, - - - - -	312
LIII. <i>a.</i> Cylindrical stone with bas-reliefs. <i>b.</i> Annular stone with bas-reliefs, - - - - -	322
LIV. Stone basin with Calendaric bas-relief sculptures, - - - - -	322
LV. Head of a divinity carved in black diorite, - - - - -	324
LVI. Feathered serpents and other subjects sculptured in greenstone, - - - - -	326
LVII. Carved shells representing winged human beings, - - - - -	329

FIG.	PAGE
42. Sketch map locating Palenque, - - - - -	153
43. Ground plans of temples, showing progress in specialization of features, - - - - -	159
44. Ground plans of round and square towers compared, - - - - -	160
45. Transverse section showing construction of Palenque buildings, - - - - -	161
46. Exterior doorways and piers with wooden lintels (restored), - - - - -	163
47. Interior doorways, with section of medial wall and ceiling, - - - - -	164
48. Interior doorway, with section of medial wall and ceiling, - - - - -	165
49. Skeleton ground plan of Palace, showing separate buildings and courts, - - - - -	172
50. Section and perspective of the eastern range of the Palace, - - - - -	174
51. Transverse section of northern end of Palace group, showing buildings and courts, - - - - -	178
52. Transverse section of the Mural Tablet Building, - - - - -	179
53. Sketch of the Tower from the northeast, as it would appear denuded of vegetation and extraneous masonry, - - - - -	181
54. Section of Tower from north to south, showing stairways and construction, - - - - -	183
55. Partial section of Tower, exhibiting various features of construction, - - - - -	184
56. Ground plan of first story of Tower, - - - - -	185
57. Ground plan of blind story of Tower, - - - - -	185
58. Section and perspective of the Temple of the Beau Relief, - - - - -	189
59. Section and perspective of outer vault or vestibule, Temple of the Sun, looking north, - - - - -	193
60. Section and perspective of back vault, Temple of the Sun, - - - - -	194
61. Sketch showing manner of building up stucco figures against the open-work roof-comb, - - - - -	198
62. Sawed strips of limestone used in building skeletons of stucco figures, - - - - -	198
63. Sketch of Temple of Cross, from Temple of Sun, - - - - -	199
64. Transverse section through middle of Temple of the Cross, - - - - -	201
65. Section of waterway arch, - - - - -	204
66. Bridge arch indicating probable character of submerged portion, - - - - -	206
67. Section of calcareous nodule containing <i>Bulimus</i> shell, - - - - -	209
68. Sketch map of Monte Alban and vicinity, - - - - -	212
69. Crest quadrangle of the Lesser Alban, - - - - -	215
70. Chamber in side of pyramid, probably a tomb, - - - - -	222
71. Colossal heads in low relief, - - - - -	223
72. Iron ax in use to-day, and an iron knife or machette of peculiar shape, - - - - -	228
73. Examples of Mitlan pyramids or substructures, - - - - -	234
74. Variations in assemblage of the buildings of a quadrangle, - - - - -	236
75. Assemblage of quadrangles in clusters, - - - - -	236
76. Transverse section of building of single beam span, - - - - -	238
77. Transverse section of building of double beam span, - - - - -	239
78. Construction of single doorway, employed where space was limited, - - - - -	240
79. Construction of triple doorway, one-half only being shown, - - - - -	241
80. Niche in the back wall of the chambers, - - - - -	242
81. Use (apparent) of stone for bridging spaces between ceiling stones, - - - - -	244
82. Theoretic roof construction, - - - - -	244
83. Continuity of paneled zones around the buildings, - - - - -	246
84. Mosaic patterns, angular forms, - - - - -	248
85. Mosaic patterns, angular and curved forms, - - - - -	249
86. Insertion of stones with curved portions of the design carved upon their surfaces, - - - - -	250

FIG.	PAGE.
87. Stones of eccentric shape used where designs turn corners of chambers,	250
88. Forms of ordinary dentate stones used in mural mosaics, - - -	251
89. Small section of painted design from lintel in the Catholic Establish- ment Group, - - - - -	253
90. Small portion of painted design from a lintel panel in the Arroyo Group,	254
91. Sketch of painted lintels, Arroyo Group, - - - - -	255
92. Section and perspective of Hall of the Six Columns, looking east,	261
93. Sketch plan of Hall of the Six Columns and the annexed consolidated Quadrangle of the Grecques, - - - - -	262
94. Section and perspective of the composite group usually called Palace No. 1, - - - - -	263
95. Drawing showing bed and sockets of ceiling beams, - - - - -	265
96. Plan of northwest corner of Quadrangle of the Grecques, - - -	266
97. Section and perspective of the Building of the Basement Galleries, -	268
98. Sketch of south end of pyramid, showing concrete floors, - - -	274
99. Gateway of fortification, looking out, - - - - -	277
100. Method of cutting out blocks of trachyte in the quarry, - - -	281
101. Partly hewn block of trachyte at base of lower bluff two miles east of Mitla, - - - - -	282
102. Partially hewn block of trachyte showing progress of cutting, -	283
103. Picks found around the large hewn stone, - - - - -	284
104. Portion of ground plan of building uncovered by Charnay, - - -	291
105. Mutilated figure of a deity, - - - - -	296
106. Figure of a deity, - - - - -	297
107. Perforations in upper end of onyx tablet, - - - - -	304
108. Engraved figure of deity from onyx tablet, - - - - -	305
109. Bone drill as it appeared in the broken tablet, - - - - -	307
110. Bone drill used in perforating onyx tablet, - - - - -	308
111. Yoke of chlorite, with partially developed figure of the frog, -	310
112. Complete design from the sculptured yoke illustrated in Pl. LII, -	311
113. Front or face view of stone yoke copied from Strebel, - - -	315
114. Design from the Strebel yoke projected on a plain surface, - - -	316
115. Devices of the closed yoke simplified to show analogies with designs on the Strebel yoke, - - - - -	316
116. Sections of the yokes shown in Fig 111 and in Pl. LII, - - -	320
117. Feathered serpent in relief, occupying the periphery of a cylinder, -	321
118. Bas-relief from periphery of annular stone, <i>b</i> , Pl. LIII, - - -	322
119. Device occupying the upper surface of the stone ring, Pl. LIII <i>b</i> , -	323
120. Symbols of the four seasons sculptured on the inner walls of the stone box, - - - - -	323
121. Feathered serpent carved in relief on the upper and back surfaces of the greenstone sculpture illustrated in Pl. LVI, - - - - -	325

PREFATORY NOTE.

The short period intervening between the publication of the first part of this paper and the completion of the part now issued, has witnessed much activity in the exploration and study of Mexican and Central American antiquities, and numerous publications, treating of the subject in one or another of its phases, have appeared. Seler has added an important work on the mural paintings of Mitla; Maler has described several heretofore little known ruins of Yucatan; Mercer has published a valuable study of the Yucatec cave formations; Le Plongeon has gotten out his long delayed book on Maya remains; Maudslay has issued an excellent work on Chichen-Itza; and the Peabody Museum has sent out a handsome volume on the ruins of Copan. Some of these publications relate to the territory covered by the present study, but their contents are not of such a nature as to make necessary any change in this sketch as originally planned.

I am much indebted to numerous friends for commendation and criticism of Part I of this work. Mr. Maudslay has called attention (*Nature*, July, 1896) to the fact that the serpent columns of Chichen-Itza terminate above in the rattles of the rattlesnake, as I had surmised, but that instead of projecting horizontally, the tail is turned upward at the tip, standing free of the entablature. It happens that this form is correctly shown in the fallen capstone, Fig. 40 of Part I of this paper. I have already made this correction in a cut published with some notes in the *American Antiquarian* for June, 1896. Mr. Maudslay points out that the statement made on page 102 of Part I, to the effect that the Mayas held possession of Chichen-Itza for two hundred years after the conquest, seems to require explanation. This statement was intended to refer to Uxmal and to express the idea that this place, along with the territory in which it stands, was not fully taken possession of by the Spaniards for about that length of time.

Mr. Maudslay has in preparation a very elaborate work on the ruins of Palenque, and has had the kindness to forward for my use his excellent map of the city, beside numerous plans and sections. I have, however, not made use of these to any great extent, as my sketches, made on the spot, serve all purposes in the presentation of this brief account. I had not fully realized our great indebtedness

to Mr. Maudslay in our explorations until I learned through a letter from him that the cutting down of the forests and the uncovering of many of the ruins were due to his enterprise.

The contemplated final chapter on the origin and development of ancient Mexican architecture will take the form of a separate publication, as it is too voluminous for insertion here. In its place, however, I have added a short chapter on Mexican sculpture, illustrated by a few specimens of special interest. Although these pieces have been presented to the Museum by Mr. Armour, and are thus appropriately described in this work, they were not secured by him in Mexico, but obtained from private owners in this country. It has not been attempted, either by Mr. Armour or the Museum, to import any important object of antiquity from Mexico, but such examples as have come within reach have been secured and cared for, and I am fortunate in being able to publish some of these for the benefit of students.

Delay in the issue of this publication is the result of pressure of Museum duties and the extremely tedious work of preparing the numerous drawings.

RUINS OF CHIAPAS.

PALENQUE.

INTRODUCTORY. The voyage from Progreso, Yucatan, to Laguna or Carmen, in Campeche, and the journey thence by land and water to Santo Domingo del Palenque, have already been sketched in the itinerary, Part I, and need not be elaborated here. The distance traversed was some 500 miles, much the larger part of which was by sea. The trip inland from Carmen was exceedingly interesting and refreshing, the country affording a most grateful contrast with the monotonous landscape of the peninsula. The ancient cities of Yucatan are situated in the midst of forest covered, yet arid, plains, and owe all they have of striking or picturesque effect to the vast systems of artificial terraces and pyramids upon which they are built, but Palenque is set back against the steep slopes of the Tumbala foot-hills, and is buried in luxuriant forests through which descend throughout the entire season (save when swollen by heavy rains) limpid and refreshing mountain streams. To the mystery and grandeur of the ruined monuments are added the peculiar charms of tropical environment, and a visit to Palenque is like a glimpse into fairyland.

Approaching the ruins of Palenque from the village of Santo Domingo del Palenque, some eight miles away, following obscure trails over the low forest-clad foot-hills, we reached a small stream called the Rio Michol, and a little farther on crossed a small western tributary called the Otolum, which descends from the highland through the ruined city. Following the left bank of this stream we ascended several hundreds of feet by steep stages, encountering terraces, fallen walls and scattering masses of architectural debris at every turn. At the left could be heard coming up from far below, the music of cascades echoing and re-echoing through the deep forest. Finally we came to a halt against a steep slope, densely covered with young forest, which proved to be the northeast corner of the pyramid of the great ruin called the Palace. We left our horses in charge of the Indian packers, and climbing the rocky terrace, entered the build-

ing and, as others had done before us, took up our residence in the corridors separating the two great courts. Having thus established ourselves, we began at once the difficult task of locating the various buildings now almost wholly hidden by the rank young forest growth which has sprung up in the few years since clearings were made by former explorers, A. P. Maudslay probably being the latest. The area occupied by the principal monuments is comparatively small, and is confined to the sides of the narrow gorge of the Otolum at the point of its emergence from the mountains. Little idea could be obtained of the general appearance of the remains, for only their summits appeared above the foliage, and all that could be seen of the surrounding landscape were the wooded spurs, several hundreds of feet high, that overlook the city, and the forest covered slopes below fading out in the great plain to the north.

The exploration of Palenque is as yet hardly begun, as detailed observations and records, even of the most superficial phenomena, have not extended beyond a few of the better preserved structures. It is impossible to say, therefore, what will yet be unearthed from these ruins and the many others said to be scattered through the almost impenetrable forest.

Of the builders of Palenque little definite knowledge has been obtained. History seems to furnish absolutely nothing, but archeology enables us to say that the people were probably of the Maya stock and intimately related with other better known Maya groups.

The literature of Palenque is already quite voluminous, the works of Del Rio, Dupaix, Waldeck, Stephens and Charnay affording an interesting and valuable body of information, and the compilations of Kingsborough, Rau and Bancroft doing much to bring order out of chaos. Morlet, Brine and others have sketched interesting visits, and Mr. A. P. Maudslay has in preparation a systematic study, which may be counted upon to furnish the most thorough and scientific presentation of the subject yet made. My own work here was limited to four days only, and though this time was utilized to its fullest extent, I was not able to explore and study more than a few of the principal ruins, and no attempt at monographic treatment of the group will be attempted. Observations will be made upon the more interesting features and characteristics of the buildings visited, and the descriptive matter will be presented with the panoramic view as a basis.

The situation of the city is remote from thoroughfares of travel and many miles distant from any settlement that can afford the conveniences and facilities necessary to the tourist or explorer, and the site has, therefore, had an exceptionally small number of visitors. It is some

eighty miles south of Carmen, on the Gulf coast, thirty miles from the Usumacinta river, and lodged against the northern base of the mountain ranges that border on Guatemala. A small sketch map is here inserted, Fig. 42, to indicate its general position.

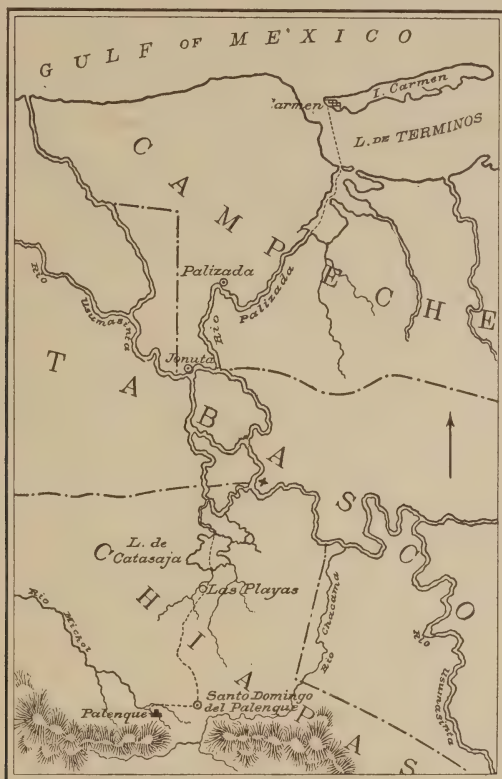


FIG. 42. SKETCH MAP LOCATING PALENQUE.

The journey from Carmen was by way of the Palizada and Usumacinta rivers to the Chiapas boundary at the point marked by a cross (x); thence southwest by the most direct waterways to Catasaja lagoon. Scale about 25 miles to the inch.

PANORAMIC VIEW. Our attention during the four days spent here was given almost wholly to the Palace and the five principal temples which rise above it against the hillsides, and these buildings are about all that can be made to appear in the panorama, which has been rather hastily drawn, though carefully worked out as to position of the monuments and general effects of the group. The point of view was of necessity assumed, and is a little to the north of the Palace, as indicated on the accompanying sketch map, and at a level about equal to that of the top of the Temple of the Cross, a hundred

feet at least above the roof of the Palace. We are thus looking almost directly up the forest-clad gorge of the Otolum and have our backs toward the far-reaching plain. Beneath our point of view and back of it, on the slope, are other ruins of buildings, walls and terraces, to include which would reduce the effectiveness of the main features of the view. The omission of the forest was absolutely necessary to the display of the ruins, and conventionalized foliage has been employed to assist in bringing out the poorly defined forms and in obscuring parts of which nothing definite is known. It should be kept in mind that in the actual view nothing would be seen, even from the point of view assumed, but a few slight bits of the crests of ruins and a glimpse perhaps into the principal court of the Palace, which has been kept clear of young trees from year to year by casual visitors.

The Palace, A, is seen at the right in the foreground; beyond rises the lofty Temple of the Inscriptions, B; and farther up the stream, set in against the hillside, is the Temple of the Beau Relief, C. At the left, across the gorge, are three buildings crowning as many pyramids; the first at the left is the Temple of the Cross, D, seen from the back; the second, to the right, is the Temple of the Sun, E, also seen from the back; and between these and a little farther away is the Temple of the Cerro, or Cross No. 2 of Charnay, F. In the immediate foreground may be detected the arched opening, G, of the mysterious waterway through which the Otolum passes for several hundred feet.

ORIENTATION AND ASSEMBLAGE. The placement of the buildings of Palenque would seem to be due more to the position and trend of the natural features of the site than to any regard for the points of the compass, though there is recognizable a general tendency to conform to these points. The walls of the Palace vary from 5 to 15 degrees from the magnetic meridian and agree in the main with the course of the stream and its banks. The Temple of the Beau Relief is a little nearer exact in its orientation, but is also in harmony with the topography. The others vary from 20 to 45 degrees from the magnetic placement. Of the principal temples one faces north, two face east, one faces south and one west (all approximately), and have thus slight suggestion of uniform relations with the valley or stream, or with the grand pile of the Palace which takes a central position with respect to the whole group of remains. The assemblage throughout is, therefore, somewhat incoherent, convenience of proximity and adaptation to topography having doubtless largely governed the placement.

One of the most noteworthy features of the group of remains is the elaborate system of terraces bordering the stream and leveling up the irregular features of the topography, even extending in a large measure to the neighboring hills. Their trend was regulated partly by the topography of the site and partly, it would seem, by a desire of the builders to conform to the points of the compass.

MATERIALS AND MASONRY. As with the Yucatec cities, there is here an abundant supply of limestone—the only available building rock in the districts visited by our party—but it is harder and less even in texture than the limestone of the north, and is often very refractory. It was, therefore, not used extensively for cutting and carving, but was broken up into portable masses and laid in mortar with natural or rough trimmed faces, and the surfaces were plastered and decorated in stucco-work or color. The walls of the tower afford a good example of this class of work, the stones used being small and heterogeneous in shape. The laying of regular courses of hewn stone was rare in the building of walls; large stones were often used where particular stress was expected or where true, firm angles were desired, as about doorways and openings, in cornices, ceilings, piers, arch-caps, roof-combs, etc., but even these are seldom well dressed as their surfaces were rarely intended to be exposed to view, every part, even the smoothest, receiving coatings of plaster or washes of color. Inner stairways employed large, well-squared stones, and numerous large slabs were required in the making of tablets, which were covered with inscriptions and figure subjects in low relief and set in plaster against the walls of temples, or in sloping positions around the courts, forming no essential part of the constructive work.

No quarries have been located, and it is not probable that well marked examples exist, as the getting out of large masses of stone was exceptional and the bulk of the masonry was made up largely of loose surface material.

Vast bodies of mortar were used in the walls and hearting, as well as in stucco work. Although it has been suggested by some writer that the lime was probably obtained by collecting and burning small land-shells, which abound in this region, it seems to me much more reasonable to suppose that lime was burned from limestone, as must have been the case in other sections where mollusks do not abound.

So far as I am able to determine, there was here, as in Yucatan, little admixture of sand with the lime. The term *mortar* serves to designate the whole range of mixtures used in masonry, stucco modeling and surface finish, without reference to composition. Lime is

everywhere the chief ingredient, though sand has been used in some cases as well as coarser materials, the latter having been added wherever floors, pavements and roofs were to be laid. Specimens of white, fine grained mortar brought home from Cozumel, Uxmal and Palenque have been examined by Professor O. C. Farrington, and the following statement is furnished by him. It is to be noted that the specimens submitted to him are of the finer, purer varieties and do not represent the full range of mortars. Professor Farrington's notes are as follows:

"The specimens of ancient Mexican mortar submitted to me for examination were for convenience numbered 1, 2, 3 and 4.

"No. 1, from Palenque, was white in color, porous, fairly tough, amorphous and homogeneous in texture except for a small quartz pebble which it included.

"No. 2, from Palenque, was of similar color and texture but very tough and compact.

"No. 3, from Cozumel, was yellowish-white, porous, friable and granular, and contained lumps of pure white, more compact material.

"No. 4, from Uxmal, was similar to No. 3 in color, tenacity and texture, but contained also harder and darker grains.

"Fragments of the specimens were first treated with hydrochloric acid in order to determine whether sand or clay, or any substance other than lime or limestone, had been used in making the mortar. All, however, were completely dissolved without residue (except No. 4, which gave a slight, flocculent residue of silica evidently not derived from the addition of a foreign substance), and therefore must be considered as wholly made up of limestone.

"The next point of inquiry was as to whether lime had been used in the making of the mortar as is the modern practice. The specimens were tested for free lime by digesting twelve hours in cold water. The solution then gave an alkaline reaction and a slight precipitate of calcium carbonate with sodium carbonate. These tests, though indicating that lime was present, were not sufficiently decisive to prove it. If lime were used in making the mortar it is a question whether it would not by this time be all converted to carbonate by its long exposure. In this case no chemical test would show any distinction. The only difference, then, to be detected between lime and powdered limestone, as used in the mortar, would be one of texture. That lime was used I believe to be indicated by the compact texture of Nos. 1 and 2, and the whiter lumps scattered through Nos. 3 and 4. The texture and compactness of these is such that they can hardly have been formed from anything else than lime.

“On grinding some of the limestone of the region, mixing it with water and allowing it to dry, it was found to set to quite a firm mass. It is probable, therefore, as the appearance of Nos. 3 and 4 indicate, that material of this character was mixed with lime for making the mortar. I believe, however, mortar such as Nos. 1 and 2 to have been made wholly from lime, which was probably obtained by burning the limestone of the region.”

Wood was extensively used for lintels, but, strange to say, no specimen has been preserved. This latter fact is used as an argument for great age by some writers, but in considering this point we must keep in mind two facts; first, that Palenque is situated in a more than usually moist district, and the prevalent moisture must have contributed to hasten decay, and second, we cannot be sure that the wood employed by these builders was the very durable zapote and not some local variety yielding more readily to decay. That wood was much used is demonstrated by the presence of hundreds of vacant lintel spaces, some of which show plaster impressions of the general shape of the beam if not of the peculiar characters of the woody surface. At least three hundred lintels were used in the Palace alone. The removal and replacement of these beams, as they became weakened by decay, must have been a great burden to the builders, and it seems a wonder that the offset arch was not more fully adopted for openings, exterior as well as interior. The use of wood was the great element of weakness in these buildings, leading to the destruction or partial breaking down of every façade in Palenque.

CONSTRUCTION. The constructive characteristics of these buildings have been referred to in the introductory pages (Part I), where a number of illustrations were given which served to indicate the many analogies and the numerous and striking differences in the buildings of the two provinces. A brief review of the principal features of the Palenque constructions may be introduced in this place.

SUBSTRUCTURES. The substructures must receive brief attention. In the better known cluster of ruins there are upward of a dozen important pyramids of greatly varying style and dimensions, eight only retaining considerable or extensive remains of their superstructures. Of the latter the panorama shows the Palace, the Temple of the Inscriptions, the Temple of the Beau Relief, the Temple of the Sun, the Temple of the Cross and the Temple of the Cerro or Cross No. 2. It is difficult to secure a definite knowledge of the original appearance of these mounds, as they are very much broken down, forming conical heaps, or are obscured by debris or vegetation. Some are built on approximately level ground and are symmetrical

in outline, while others are set against the mountain sides, taking the character of terraces. The slopes are steep—reaching 45 degrees or more—and it is evident that all, or nearly all, were faced with hewn stone or finished in plaster. Some were terraced, and the Palace had the slightly sloping faces of the successive steps paneled or coffered—in part at least—in hewn stone, something as in the pyramid of El Castillo at Chichen-Itza. The greatest height is about 80 feet.

Much diversity of opinion has been expressed with respect to the stairways by means of which the pyramids were ascended. It seems reasonable that a building having a single entrance should be approached by a single stairway, but Stephens and others seem to convey the idea that some of the temple pyramids have, or had, stairs on all sides and covering the entire surface. That such is or ever was the case I am inclined to seriously question. It is to be expected, however, that if the building has doorways on all sides there will be stairways to correspond; and I am of the opinion that one or more flights will be found to have existed for each front of the broad compound terrace of the Palace. Most of the stairways exposed to view at the present time are short interior flights built of hewn stone, though a few are of rough masonry and were probably finished in plaster.

It appears that the ancient builders did very extensive remodeling of the original topographic forms adjoining their structures, and the terraces, rising from the stream level to the levels upon which the pyramids stand, have been graded and probably faced—as were the pyramids—and furnished with convenient stairways. The surface of nearly the entire area included in my map, Pl. XXIV, besides much beyond its limits, has been remodeled by human hands.

As to the composition of the interior mass or hearting of the pyramids, I could form little idea, save from the appearance of the debris in cases where there were breaches not entirely hidden by the omnipresent vegetation. There can be little doubt, however, that, as in Yucatan, it consists of heterogeneous bodies of earth and stones, with mortar where it was most needed. It would appear that often, if not generally, the construction was first carried up with vertical walls and that abutting masonry was afterwards added, forming a slope corresponding to that adopted for the stairways. The platform floors were as a rule finished in cement or concrete, but slabs of limestone were used to a limited extent.

SUPERSTRUCTURES—GROUND PLAN. The buildings of Palenque, so far as preserved, occupy nearly the entire area of the platforms of the substructures, and I saw no esplanade having a width of more than

six or eight feet; generally it is less than three feet. In the temples the ground plan is extremely simple and uniform, but it is quite complex in the one great structure, or group of structures, called the Palace. The buildings consist, in most cases, of vaults, constructed very much the same as in Yucatan, arranged in pairs under a roof that slopes from a medial ridge to the eaves at both sides and ends. The temple plans given in Fig. 43 show the front wall, interrupted more or less frequently—one, three or five times—by doorways, and the medial wall separating the two vaults perforated by as many doorways as there are apartments in the back vault. The essentials of the plan are a vestibule occupying the entire front vault and a sanctuary occupying all or part of the back vault. In several cases partition walls divide the inner vault into a sanctuary and two lateral chambers, as seen in *c* and *d*. A most notable feature of the better class of structures is an inner sanctuary or tablet room, which is a small chamber built within the sanctuary and against the back wall, as indicated in *d*.

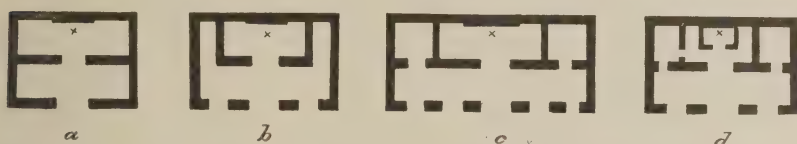


FIG. 43. GROUND PLANS OF TEMPLES SHOWING PROGRESS IN SPECIALIZATION OF FEATURES.

- a.* The simplest form with vestibule and tablet room entered by single doorways.
- b.* Triple entrance and special tablet room.
- c.* Five doorways and a tablet room with lateral chambers.
- d.* Addition of an inner sanctuary intended to still further seclude the sacred tablet.

The tablet in each case is placed against the back wall at X.

The great cluster of buildings called the Palace, (see panorama), consists for the most part of a remarkable aggregation of the double vault units which vary in length and arrangement of apartments as indicated somewhat closely on the map, and in Fig. 49. In the lower-level building, at the south end, three long east and west vaults are placed side by side. There seem originally to have been few partitions in the open or corridor-like vaults of the exterior as well as most of the interior ranges, though thin walls have been added in some cases.

The Tower is unique in many of its features. It has been described as "a tower within a tower," but this indicates a misconception as it is rather to be regarded as a building with a single square enclosure or room on each floor, upward through the center of which a stairway has been built, the so-called inner tower being only the

masonry column necessary to support and contain the stairway. The plan, Fig. 44, A, is somewhat analogous to that of the round tower of Chichen, Fig. 44, B, where there is a cylindrical central column containing the stairs.

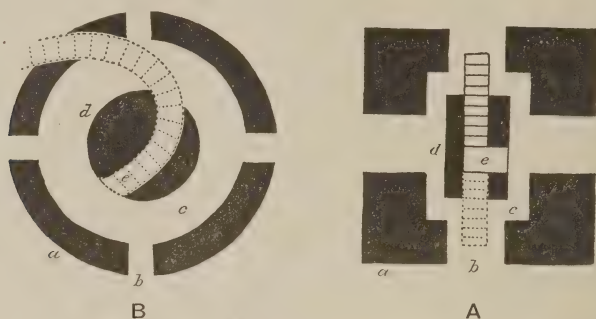


FIG. 44. GROUND PLANS OF ROUND AND SQUARE TOWERS COMPARED.

- a.* Four sections of walls.
- b.* Four doorways.
- c.* Inclosed spaces.
- d.* Central shafts carrying stairs.
- e.* Entrances to stairways. The spiral stairway passes up through the central column and over the arch all the way through solid masonry. The other has a flight and landing for each story (Lower flight in solid lines, upper in dotted lines.)

Of course in the Chichen tower we have a second wall added without, not shown here, and the vaults are arched, while in the Palace tower some vaults are arched and others flat, according to the available vertical space.

PROFILE AND CONSTRUCTION. The construction of the Palenque building is well shown in the generalized section, presented in Fig. 45, which should be compared with the section of a Yucatec building given in Fig. 5, Part I, and with the Mitlan building farther on in these pages.

The walls are from 2 to 4 feet thick and rise directly from the pavement with vertical faces to the spring of the arch within and to the eave moldings without—a height varying from 8 to 10 feet. The vault face within has a slope of some 65 or 70 degrees, while the outer surface, instead of rising vertically as in Yucatan, slopes inward at an angle corresponding pretty closely with that of the soffit slope within. The medial molding of the Yucatec wall becomes the eaves molding of the Palenque building, and at the level of the cap-stone of the arch there is exteriorly a second line of moldings, corresponding to the cornice molding or coping of the Yucatec structures; and above this the roof proper has a much reduced pitch, giving the effect of a mansard roof. The vault within never exceeds 10 feet in width,

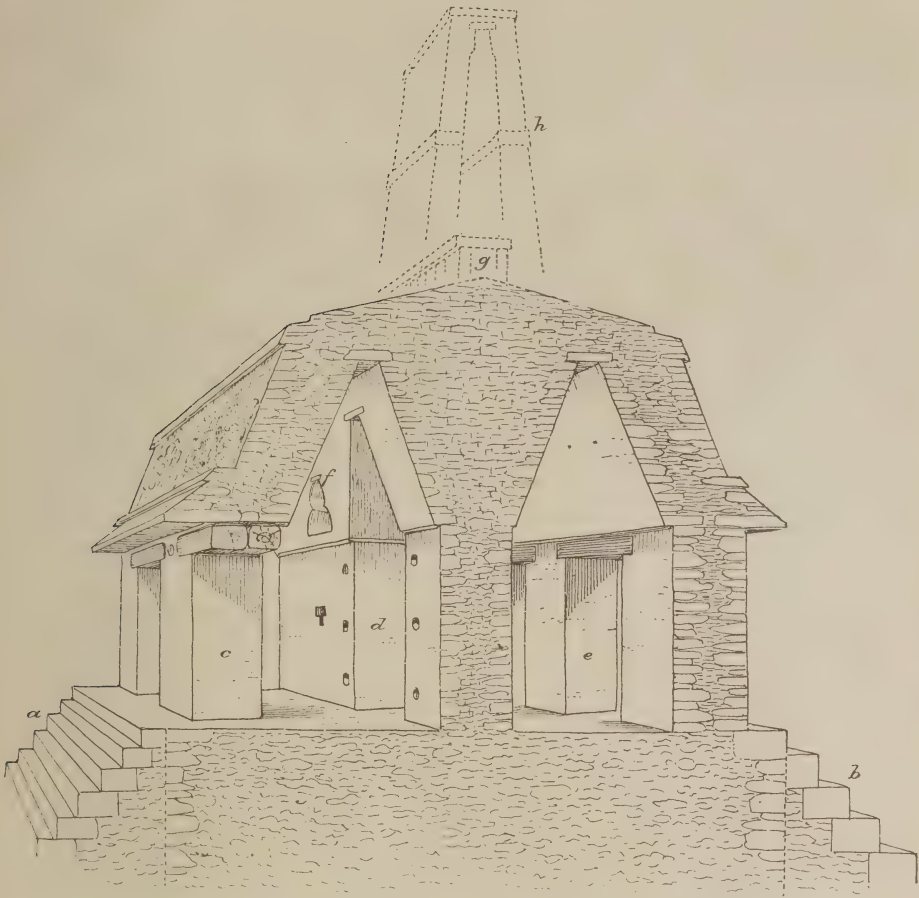


FIG. 45. TRANSVERSE SECTION (SOMEWHAT GENERALIZED) SHOWING CONSTRUCTION OF PALENQUE BUILDINGS.

- a.* Outer stairway ascending pyramid.
- b.* Inner stairway ascending from court; relation of stairways to body of pyramid somewhat uncertain (see dotted lines).
- c.* Pier separating doorways; section of wooden lintels (restored) above.
- d.* Doorway through medial wall connecting corridors; cord holders at sides.
- e.* Inner pier and doorway facing court.
- f.* Trefoil opening through medial wall.
- g, h.* Two principal varieties of roof-comb.
Projecting eaves and sloping, decorated roof.

but the height in the larger buildings is often 18 feet or more. The insloping walls of the arch are connected above by slabs of limestone, as in Yucatan. In one or two cases in Palenque the entablature zone (as defined in Part I) is vertical or nearly so, and the roof proper is

nearly flat, thus seeming to suggest a transition from the flat to the pitched roof. Charnay believes that the difference between the Yucatec and southern roof may be accounted for by the difference in climate between the two sections. Chiapas has a prolonged wet season, with exceedingly heavy rains, and a steep roof would become a necessity; while Yucatan has much less rain and the flat roof was sufficient protection. It may be, however, that the difference in pitch arose independently of climatic influences. When the offset arch developed and took the place of the horizontal beam the several feet of added elevation required changes in exterior profile, and it seems quite as natural that the added exterior surface should slope inward with the slope of the arch forming a watershed, as that it should be carried up vertically as in the Yucatec structures and in certain buildings here in Palenque. Allowing, however, that both forms are independently developed from the horizontal span, it is plain that the sloping form is more likely to have arisen in the wet climate and the vertical wall and flat roof in the dry climate.

The roof-comb is an important feature of these structures, though it is absent in some cases, notably in those having flattish roofs. In the better preserved buildings of the Palace group, and in some of the temples, it appears to consist of a balustrade-like arrangement of stone slabs, as shown in the figure, but in three or four of the temples it becomes a most important and striking feature, as indicated by the dotted lines. In these buildings the roof slopes continue around the ends as well as the sides, so that the comb does not extend the full length of the building, as in Yucatan, being limited to the crest line.

DOORWAYS. The doorways of the Palenque buildings differ considerably in appearance from those of Yucatan, but involve no new principle of construction, the peculiarities being the result of minor differences in form merely.

Exterior doorways are mere rectangular openings in the walls, (Fig. 46), often so numerous that they occupy the larger part of the space, leaving squarish pillars between. They were spanned by wooden lintels, generally in pairs or threes as indicated by the impressions left in the masonry. The construction is illustrated in the figure which shows also the circular glyphs at the top between the lintels of adjoining doorways, but the handsome reliefs of the pillar faces are omitted.

Inner doorways are sometimes squarish, as are the outer, and were spanned by stone or wood; but in many cases they are arched above, the construction and style varying with the situation.

Fig. 47 shows the effect of carrying the arch upward into the thickening partition or medial wall, and at the left is seen a smaller, side entrance, not reaching up to the spring of the chamber vault. Over this is a window-like opening through the partition wall arched above as are the doorways.

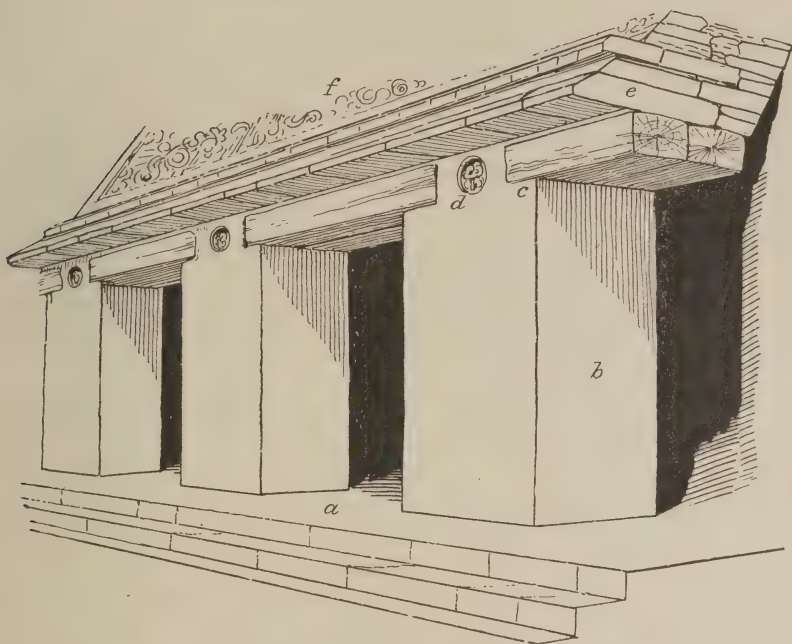


FIG. 46. EXTERIOR DOORWAYS AND PIERS WITH WOODEN LINTELS (RESTORED).

- a.* Stairway, narrow esplanade and entrance.
- b.* Masonry piers with stucco finish and decoration (omitted).
- c.* Wooden lintels restored conformably with sockets.
- d.* Circular glyph between lintels.
- e.* Eaves.
- f.* Sloping roof with stucco decorations.

An ambitious attempt at doorway elaboration is illustrated in Fig. 48. The soffit is constructed with a double curve, which is very graceful and gives a somewhat trefoil effect to the opening.

PILLARS. The specialized column, forming a square or round shaft separating wide entrance ways and supporting the lintel and entablature, is unknown in Palenque, and we find only the flat, squarish pillar, which is merely a section of the normal wall of the building, separating doorways. These pillars occur in pairs or in larger numbers according to the number of the doorways. They are always of masonry finished in plaster, and very generally the exterior surface is embellished with figures in stucco, as shown in Pl. XIX.

In all cases they are marred at the top by the falling of the wooden lintels the ends of which were set into the masonry flush with the front.

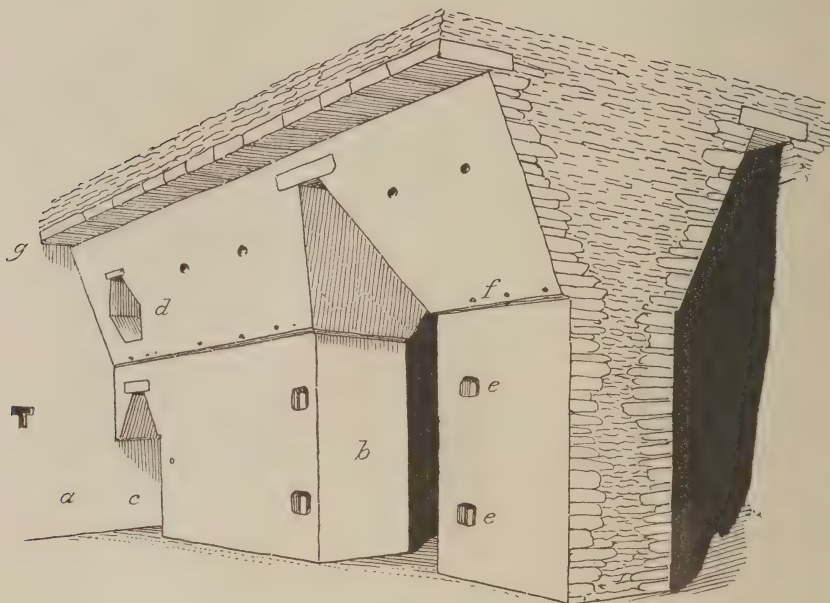


FIG. 47. INTERIOR DOORWAYS (THROUGH MEDIAL WALL) WITH SECTION OF MEDIAL WALL AND CEILING.

- a.* End wall of vestibule (outer vault).
- b.* Entrance to sanctuary (rear vault).
- c.* Entrance to ante-room.
- d.* Window-like opening through medial wall.
- e.* Large cord holders at sides of door.
- f.* Small cord holders in offset of vault.
- g.* Section of ceiling showing capstones and roof masonry.

SCULPTURE. Although bas-relief sculpture and modeling in stucco were practiced with boldness and much refinement in Palenque, sculpture in the round seems to have been almost unknown. Even the two figures found on the slope of the pyramid of the Cross and described by Stephens* are hardly more than reliefs, as the sides are rounded merely, not sculptured, and the backs are flattish and rough. They are not statuary in the proper sense, but probably served as pier fronts or balustrade embellishments. The material is doubtless the limestone of the vicinity. The example pictured by Stephens is 10½ feet in height, though without the head-dress and tenon-like base the figure is found to be not above 5 or 6 feet. I was not so

* Incidents of Travel in Yucatan, Vol. II, p. 394.

fortunate as to find this specimen, though it is probably still lying at the base of the Temple of the Cross hidden by the dense undergrowth.

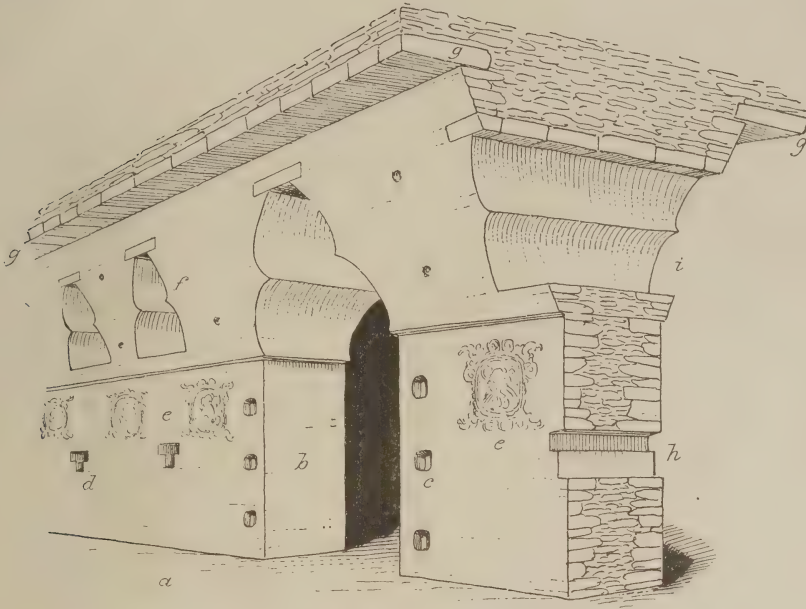


FIG. 48. INTERIOR DOORWAY WITH SECTION OF MEDIAL WALL AND CEILING.

- a.* Floor of outer corridor.
- b.* Doorway through medial wall (trefoil arch, modified cuneiform).
- c.* Cord holders.
- d.* Tau shaped niches and openings, section at *h*.
- e.* Stucco reliefs; rococo-like framework inclosing relief busts.
- f.* Trefoil, window-like openings through medial wall, section at *i*.
- g.* Section of ceiling stones and roof masonry.

It is a noteworthy fact that mural sculpture, so common in Yucatan, is here replaced almost wholly by stucco modeling, the sacred tablets set in the walls of sanctuaries in the various temples, and a few minor tablets in other situations alone being sculptured. There are six, possibly more of these tablets of large size, and beds are found for six inferior tablets which occupied the narrow faces of the tablet chambers at the sides of the doorways. Two of these, from either the Temple of the Sun (Stephens) or of the Cross (Charnay), have been carried to Santo Domingo where they are set in the walls at the sides of the church door. Illustrations of the latter figures are given by Stephens,* and their place at the sides of the inner doorway is shown by him in an excellent plate facing

*Incidents of Travel, Vol. II, facing page 353.

page 354. In one of the corridors of the Palace I found a small fragment of a thin slab that had been sculptured in the usual style in low relief and painted a bright red. These tablets are all in low relief and the tasteful designs, including human figures, symbols and glyphs, are worked out with a delicacy of relief and a refinement of finish unsurpassed in any equally important work in stone in this country. They are totally distinct in character from anything in Yucatan or the Mexican plateau. In some respects these works do not compare well with Assyrian and Egyptian sculptures representing somewhat kindred subjects, but they are more elaborate, exhibit equal facility and freedom in drawing and certainly embody a more complex and fanciful system of symbolism. In style they are more Oriental than Assyrian or Egyptian.

Aside from the tablets mentioned the most important sculptures are found in the two great courts of the Palace. One group consists of archaic looking figures of men and women occupying the faces of large heavy slabs of limestone set at a steep angle against the temple foundation at the sides of the broad flights of steps within the courts. These seem of the nature of portal guardians as do also the sculptures at the heads of stairways and the relief figures occupying the antæ of the inner sanctuaries of the temples. Their function must have been distinct from that of the tablet sculptures and again from the stucco roof-comb decorations.

STUCCO WORK. The builders of Palenque, so far as the preserved monuments show, were the greatest stucco modelers in America. The Izamals did bold and effective work, as did the builders of Labna and other places, but here modeling in stucco was the chief reliance of the builders in all matters of finish and decoration, interior and exterior; pillars, wall spaces, broad roof slopes and lofty roof-combs were covered with marvelous figures rivaling in elaboration the composite sculptures of Uxmal and Chichen, and exceeding them in freedom of treatment and refinement of style, the seated figure in the Temple of the Beau Relief, if the drawing of Waldeck can be relied upon, being one of the greatest masterpieces of American plastic art. In the Palace and its associated temples there were something like eighty heavy exterior piers, rectangular in section, varying from 3 to 6 or more feet in width, from 6 to 12 feet in height and from 2 to 5 feet in thickness, separating the entrances and supporting the entablatures of the façades; half as many more served the same purpose in the various courts and interior corridors, and a large percentage of these were faced with masterly groups in stucco accompanied by glyphic inscriptions

executed in the same style and bordered by narrow lines of formal patterns similarly treated. The main roof spaces of the buildings were all treated as panels and filled with compositions in bold relief and of remarkable freedom of drawing. They embodied human figures in various attitudes, great heads, grotesque faces and monsters, all strongly modeled, tastefully grouped and surrounded with flowing decorations. The roof-combs, with which most of the buildings were supplied, some large and some small, and erected apparently for the express purpose of giving scope to the genius of the stucco worker, were even more richly embellished and many remains of the subjects still cling, after the lapse of four centuries, to these lofty façades. Few efforts at exterior architectural embellishment in any land have been more boldly conceived. Imagine florid compositions worked out in strong relief, filling the roof-combs of the temples 50 to 100 feet above any possible point of view; and beneath these broad sloping roof zones similarly treated, followed again by rows of wide pier fronts faced with handsome figures surrounded by glyphs; and below this still, set against the pyramid or bordering the stairways other equally elaborate works, the whole finished in varied and brilliant color. Let those who wish to secure a more complete notion of the character and rank of this work examine, in connection with the foregoing remarks, the examples represented imperfectly as to relief, freedom of drawing, color and suggestion of size, in Stephens' *Travels*, Vol. II, opposite pages 339 and 344, and in Charnay's *Cities of the New World*, facing page 236 and on page 457; the latter from Lorillard town suggesting more fully perhaps than any other illustration so far given the exuberance of fancy characterizing these strange symbol-loving people. The best illustrations to be obtained of the meager remnants of these stucco masterpieces of the Palenque temple roofs are a set of superb photographs made by Mr. Alfred Maudslay of London, an example of which appears in Pl. XXI. It is a source of much regret that all of these works show signs of rapidly advancing decay.

COLOR. Color was lavishly used by the people of Palenque and there is no reason to doubt that it was tastefully used in both symbolic and purely æsthetic applications. Black, white, blue, two reds, yellow and green are seen, the scale corresponding very closely with that used elsewhere in Mexico and in Central America.

The plaster and stucco used were white, and some walls, ceilings and other surfaces were allowed to stand in the plain color, but as a rule not only the show spaces but often obscure surfaces were carefully tinted, and the outside walls and even the roofs and roof-combs

were finished in color. As weathering, decay or use injured the colored surfaces other applications were made, and it is not uncommon to find in broken edges six or more successive coats, more or less deeply buried by renewed applications of plaster or washes of plain color. Color was used also in decorating the walls with various designs, geometric, graphic and glyphic, and numerous traces are still seen in protected places. The most elaborate and showy work was in the painting of stucco reliefs, including figures, groups of figures, symbols, etc., with which many parts of the buildings were embellished. The colors as they stand to-day are often bright and pleasing, and it is a most remarkable fact that on surfaces fully exposed to the elements and to the destructive agencies of vegetable and animal life for 400 years or more, these tints are still well preserved.

The employment of colors in painting the relief groups was no doubt highly conventional, and regulated perhaps by symbolic rather than by æsthetic canons; it is observed, however, that, as a rule, the flesh tones are red or reddish, a rather pale tint prevailing, while costumes, symbolic devices and ornaments employed the whole native palette. Of the nature and composition of the colors little can be made out with certainty, though most of them are no doubt of mineral origin. The sienna red used so generally in all Maya and Nahuatl countries is said to be of vegetable origin, being obtained by steeping a red wood which is found throughout the Mexican and Central American States.

IMPLEMENTS. As to the implements and devices employed in these embellishing arts little has been learned. Stone tools were no doubt used by the sculptor, simple modeling tools of wood or bone by the stucco worker, and brushes of hair or vegetable fiber by the painter. The only implement I had the good fortune to secure was an agate blade—a knife or a lance head—three inches long and one and a half wide. It was found in the Temple of the Sun, and was so coated with calcareous deposit as to seem merely an oblong, flattish pebble.

STAIRWAYS. As stair builders the Palenquans were probably superior in some respects to the Yucatecs; they were familiar with effective methods of introducing stairs into interior construction, there being half a dozen examples of such flights. The Tower has two flights, and the stairways leading from the upper-level buildings of the Palace to the southern lower-level vaults have landings and make various turns within the masonry body. Some of the short flights that lead from the courts to the adjoining galleries are of special interest. They

are formed of large stones, on which are sculptured glyphic inscriptions, and at the sides are unique sculptures in bas-relief. Stephens and Charnay have given satisfactory illustrations of these features. So far as I could observe there are no traces of the remarkable serpent balustrades so common in Yucatan, their place being taken by human figures in relief placed in slanting positions.

THE PALACE GROUP. The "Palace," as it is usually called, is a composite structure—a great group of closely associated structures—not surpassed in interest and importance by any other group of Maya remains north of Guatemala. It is so complex and extensive and withal in parts in such an advanced stage of demolition that the time at my disposal did not permit of a satisfactory exploration. The group undoubtedly represents a long period of growth, the people probably passing meantime through many minor mutations of fortune and art. There appear to be ten or more somewhat independent units of construction (Fig. 49), but the order of their development cannot be made out save in a tentative way. The general consistency of style characterizing the great exterior ranges of buildings toward the north, taken together with their superior state of preservation, would seem to indicate a later date for them than for the southern members of the group. The addition of these superior buildings and the unifying of the whole group by carrying the galleries and terraces somewhat uniformly along the four sides, appear to indicate also that the greater period of power and culture was toward the close, a period probably ante-dating the conquest by decades rather than by centuries.

This group of remains, as it stands to-day, if denuded in the main of its enveloping foliage, is correctly indicated in the panorama, although I have ventured to bring out certain forms more distinctly than they would appear in a photograph. This is done in cases only where the forms concerned are known. There is no attempt at restoration. The original appearance of the group must have been striking and impressive, and the restoration (after Armin), published by Bancroft* in a small wood cut, though manifestly wrong in numerous details, is still capable of conveying a fairly correct impression to those who keep in mind the general crudeness of Maya work as contrasted with the mature construction and finish characterizing the early temple architecture of Southern Europe, Egypt and the Far East.

THE PYRAMID. The substructure of this group consists of the great platform at the north supporting the principal buildings—in the foreground of the panorama—and a lower terrace at the south,

* Vol. IV, p. 323.

supporting an annexed subordinate structure not seen in the panorama. The main mass varies from 20 to 30 feet in height and measures at the top some 200 feet from east to west, and 225 from north to south. The former measurement is that of the north margin; the south end probably falls 15 or 20 feet short of this. The lower terrace, occupied by the south end building, though poorly defined, is about 40 feet wide and 180 feet long. The original slope of the sides closely approximated 45 degrees.

The site occupied is a somewhat level space, extending back from the west bank of the Otolum. The stream washes (at least at seasons of high water) the southeast corner of the pyramid, but opposite the northeast corner is nearly a hundred feet away, and the channel is depressed to a depth of twenty feet or more. The north and west sides retain their original contour pretty closely, but the east side is broken down and irregular. Here the main slope has been undermined by the powerful torrents of the wet season, and near the middle the abutting masonry has been broken down, exposing what appears to be the vertical wall of the original facing. At the south end also a considerable portion of the nearly vertical facing is exposed, and at the corner the wall rises some twelve feet in two steps, with a sloping rise above to the corner of the main corridor. It is seen here also that the subordinate terrace at the south, some 30 feet long on this side, is set back several feet and faced with a nearly vertical retaining wall. These features are but slightly indicated in the panorama and are barely suggested on the map.

I am able to add little to existing knowledge of the terrace facings and stairways, as nearly everything on the slopes is covered with debris. A principal stairway was probably located on the north, but there were certainly flights on the east and west as well as on the south. It is clear that the north face, to the right and left of the stairway, was terraced, as indicated by Dupaix, and faced in part at least with large, accurately hewn stones, as shown by Charnay. Possibly Maudslay or others have secured additional details of conformation and finish, but such have not come to my notice. It is probable that, as in many cases in Yucatan, the terrace mass is composed largely of earth and stones, and was faced with strong vertical or nearly vertical retaining walls, afterwards covered in by stairways, sloping buttresses and facing. Portions of such a wall are seen on the east front, as already stated; they were exposed by the ravages of torrents, by which agency the stairways and abutting masonry may have been carried away. An examination of the interior of the pyramid would probably bring to light many interesting features in the way of incor-

porated walls, passageways, etc., and show separate stages of growth; the latter are probably in a measure represented by the successive levels of building observed at the south end and in the several courts, and by differences in the style of the buildings.

The ground plan of the group of superstructures—indicated on the map, Pl. XXIV, and in Fig. 49—is exceedingly interesting, and in a general way is well given by Waldeck, Stephens, Dupaix, and in part by Charnay. There is much difference in details, but owing to the advanced state of ruin the differences cannot be settled without extensive excavation. Charnay made important observations as to the pronounced assymetry of the plan at the north end. The position and plan of the southern subordinate building is indicated by Waldeck only.* An analysis of the plan indicates the existence of a number of more or less independent structures, but I am not able to speak with certainty of more than a dozen of these. They are designated by letters in the accompanying skeleton plan, Fig. 49. First we have the north exterior range, **A**, connected with the east and west wings **B** and **C**. Second, the north interior building, **D**. Third, the south end exterior buildings, **E**, **F**, **G**, **H**. Fourth, the House of the Mural Tablet, **I**. Fifth, the House of the Decorated Tau, **J**. Sixth, the Sanctuary Building, **K**. Seventh, the Tower, **L**. Eighth, the imperfectly made out structure, **M**; and ninth, the subjacent building, **N**. In addition there are numerous remnants of walls within the courts, notably those connected with the Tower and with the structures at the south end of the southwest court. The four principal courts are indicated by the letters, **O**, **P**, **Q**, **R**. The opening of the waterway is at **S**, the washout exposing the tunnel is at **T**, and the upper end where the water sinks is beyond **U**.

THE BUILDINGS, A TO M. It is not my intention to try to describe all the buildings with any degree of minuteness, though my notes are voluminous, but I shall sketch them briefly, keeping the panorama always in view.

These buildings, largely separate in construction and varying considerably in height and profile, were in many cases knitted together by connecting structures or masonry (omitted from the plan for the sake of clearness) making the group, in a large sense, a unit. The exterior ranges were, in this way, rendered practically continuous, and perhaps entirely so so far as the exterior lines of pillars are concerned.

As seen to-day this wonderful pile of structures presents a most dilapidated and pitiful appearance. Five or six buildings only have

*The recent surveys of Maudslay are far more complete than any that have gone before. I have utilized his work to a slight extent in the preparation of Fig. 49.

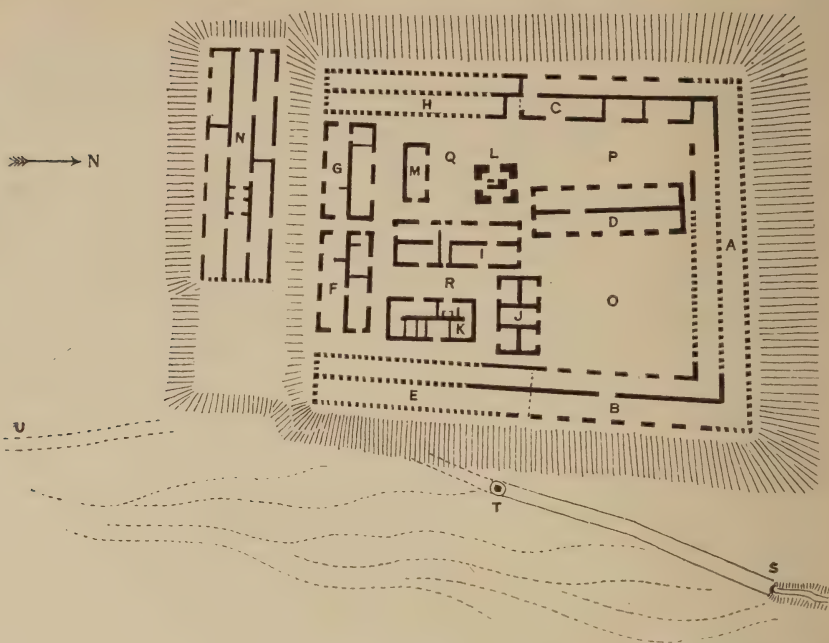


FIG. 49. SKELETON GROUND-PLAN OF THE PALACE, SHOWING SEPARATE BUILDINGS AND COURTS.

Minor connecting walls and additions are omitted for the sake of clearness.

- A. North range; in an advanced state of ruin and apparently connecting fully with B and C—well preserved sections of the east and west ranges.
 - D. North interior building; well preserved.
 - E. Southern half of east range; in advanced state of ruin.
 - F. Eastern half of south range; well preserved.
 - G. Western half of south range; well preserved.
 - H. Southern half of west range; advanced state of ruin.
 - I. Building of the Mural Tablet; well preserved.
 - J. Building of the Decorated Tau; well preserved.
 - K. Building of the Sanctuary; moderate state of preservation.
 - L. The Tower; well preserved.
 - M. Small building in southwest court.
 - N. Subjacent structure with triple vault.
 - O. Great court (northeast).
 - P. Northwest court.
 - Q. Southwest court.
 - R. Southeast court.
 - S. Opening at lower end of waterway.
 - T. Washed opening into waterway.
 - U. Point near which water sinks into obstructed entrance to waterway.
- Heavy dotted lines indicate obscured walls.
Light dotted lines indicate flood channels.

their roofs largely intact, and these, together with portions of the north ranges and the Tower, are all that do not present the appearance of mere heaps of debris. Of the original exterior range of pillars, upwards of forty in number, none are visible on the north side; five stand on the east front to their full height; seven or eight are partially

preserved on the south side, and six are complete on the west side. A few have but recently tumbled down the slopes, and the stumps of many more are hidden by heaps of debris.

As seen in the panorama, the north range, A, has lost its entire façade, and the roof also is gone, save narrow parts along the medial wall which itself is much broken down. The back wall of the outer corridor (the medial wall of the building) and the line of debris that marks the many pillared front are the principal features remaining to be represented. The profile at the right shows the overhanging inner wall of the exterior vault.

Connecting with this range, at the ends, are the north and south ranges, B and C, and practically connecting near the middle is the well preserved building, D, separating the two northern courts. Facing these courts on the south side are other members of the group, I, J, L, well shown in the view. Beyond are glimpses of the southern courts, and the debris-hidden ruins of that side.

The northern buildings, A, B, C, D, present nearly identical conformation and construction, and may be in a measure described in common. The southern exterior ranges were probably very similar in their principal features and no attempt to analyze them will be necessary. All consist of twin vaults of usual construction, as shown in the sections, Figs. 45 and 50. The width of the vault is from 7 to 8 feet and the height from 15 to 20 feet. The exterior vault—seen in part in the panorama near the northeast corner of the building—appears to have been almost continuous all the way around and was entered by upwards of forty wide doorways separated by pillars somewhat narrower than the openings, save at the corners and perhaps in one or two other exceptional cases. The medial wall separating the vaults had but few openings, two of which are perfectly preserved, one in the east building and one in the west, as shown on the plan. A similar doorway opens through the medial wall of the north interior building. I could detect no trace of a passage through the much ruined northern medial wall, and none of the plans published indicate such a feature, but the advanced state of ruin prevents satisfactory examination. The earlier published plans show several openings, of varied position and character, on the south side. In the northern ranges the inner walls facing the courts are perforated by doorways, in the same manner as the outer walls, and both exterior walls of the interior building, D, are likewise pierced, so that there are no chambers or closed spaces, though at some period of the occupation thin partitions have been built at various points, connecting the pillars with the medial wall; these are now mostly

demolished. The vaults thus take the character of corridors, open everywhere to the sun and air, and are separated by the almost continuous medial wall.

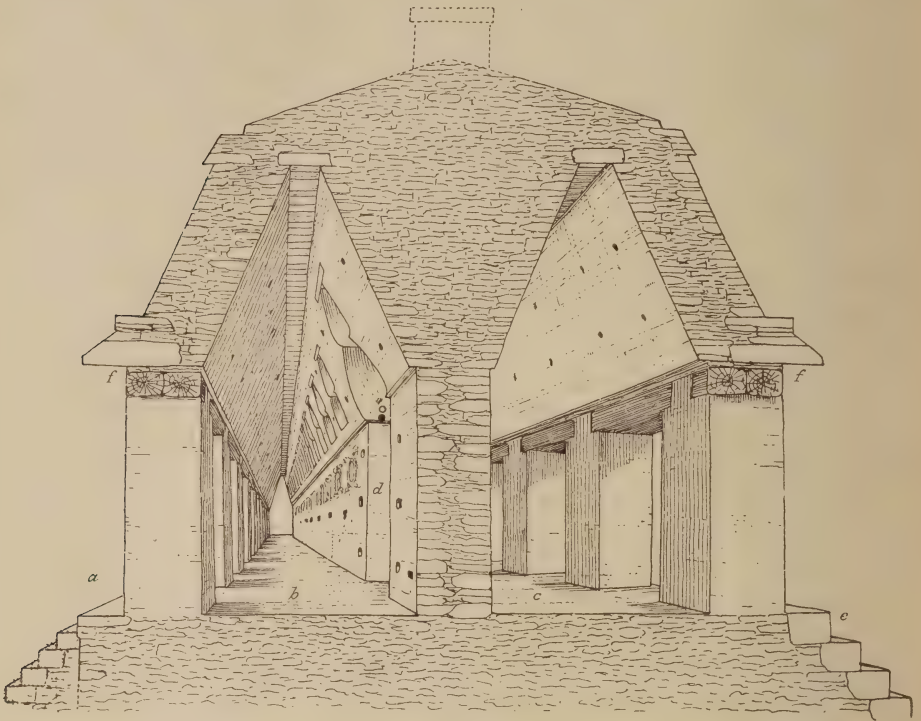


FIG. 50. SECTION AND PERSPECTIVE OF THE EASTERN RANGE (B) OF THE PALACE, SHOWING CONSTRUCTION AND CONTINUING PERSPECTIVE OF OUTER CORRIDOR.

- a.* Eastern front; stairway restored.
 - b.* Outer corridor; lintels restored.
 - c.* Inner corridor; lintels restored.
 - d.* Doorway with trefoil arch through medial wall.
 - e.* Stairs, descending to court.
 - f-f.* Sections of lintels (restored) and eaves.
- The roof-comb is too much broken down to be analyzed.

The accompanying sketch, Fig. 50, gives a sectional view of the two corridors looking south from a point near the north end of building B. It shows the eastern or outer corridor on the left—the perspective being prolonged to suggest something of the original effect; and the inner corridor on the right, seen at such an angle as to give a good idea of the piers and doorways and the manner of inserting the lintel beams. A brief description in connection with this illustration will convey a sufficiently full and definite notion of the appear-

ance and character of the vaulted galleries of Palenque. The floor is level and well cemented and is 27 or 28 feet in width. The space outside the walls—the esplanade—is very narrow, and at the left, overlooking the stream bed (bridged), it is only 26 inches wide. It is probable that the stairway and abutting masonry, (now removed leaving the original vertical wall face exposed), added somewhat to the width. The steps at the right, descending into the court, are six in number and are built of well cut blocks of limestone. The upper step, or esplanade, is 26 inches wide and 12 inches high. The remaining steps average about 18 inches in width of tread and rise. The walls are about 3 feet thick and rise vertically nearly 10 feet. The soffit slopes of the vault ascend from the narrow offset at a high angle (some 70 degrees) to the ceiling stones. The vault is between 19 and 20 feet high. The width of the outer vault is 7 feet 3 inches, and of the inner 7 feet 6 inches at the points measured. The strongly marked eaves—the “medial molding,” as the corresponding feature of the Yucatec buildings was called—project 24 inches, and on the outer surface slope back at a sharp angle to connect with the lower roof slope, which is some 6 feet wide and rises at an angle of about 70 degrees. The roof slopes were usually filled with elaborate designs in stucco, of which only traces remain. A glance at the sloping roof space of the inner building, as given by Charnay,* will make clear the manner of applying these ornaments. This space is bordered above by a second angular molding, less pronounced than that below, and from this the narrow roof-space proper extends at a low angle to the base of the roof-comb. This latter feature is in an advanced state of ruin, but enough remains to show that it probably consisted of a balustrade-like line of stone work, as indicated by dotted lines in the section. The masonry consists in the main of rather small stones of irregular shape, embedded in excellent mortar. Large slabs are used in the construction of wall openings and projecting features of the roof. Surfaces not occupied by decorations in relief, are neatly, though not very evenly plastered, and have been colored in white and possibly in other hues. The perspective, rather imperfectly developed, extends the view a considerable distance to suggest the effect when the whole length was standing. At present there are but five piers remaining at the left, while the four at the right, facing the northeast court, are all in place. These piers—mere sections of the walls—are 3 feet thick, about 6 feet wide and 10 feet in height. The doorways are about 9 feet wide and nearly 9 feet in height to the lintel sockets which are now ragged holes in the tops of the piers. I

*Ancient cities of the New World, p. 236.

have restored the lintels to indicate their placement more clearly. All have disappeared, but the shape of the beam is in several cases clearly impressed upon the plaster bedding. The over-door masonry is more or less broken out in nearly all cases. The exterior surfaces of the outer piers were occupied by stucco groups in relief, and portions still remain, (see Pl. XIX). The end pillar at the south and probably the corner pillar at the north (now missing) had glyphs instead of figures; and roundish glyphs occur at the top between the lintel ends. This latter statement is true of most of the piers in the group. The inner piers, facing the court, seem to have been plain.

The medial wall is of special interest on account of its four or five unique or novel features. First of these is the great doorway which pierces the wall, connecting the exterior with the inner gallery and thence giving entrance to the court. It is 8 feet 10 inches wide and 18 feet high. The arch penetrates the thick masonry of the wall above, and the soffit surfaces are curved in a peculiar manner, giving a somewhat trefoil outline. The construction of this arch is illustrated in Fig. 11 of the introduction, Part I. The ceiling stones are as usual, and the length of the arch ceiling (the thickness of the wall at that level) is 7 or 8 feet. A second and very novel feature appears in the window-like openings penetrating the upper wall at the right and left of the doorway. They are also sub-trefoil in shape, are ceiled above with the usual slabs, are about $4\frac{1}{2}$ feet wide and 5 feet high, and at the top about 6 feet long from face to face of the connected vaults. A third feature is a series of tau-shaped and squarish openings in the lower wall. A fourth feature is the large dumb-sheave cord holders at the sides of the door; and a fifth is the line of wall decorations alternating with the tau openings though somewhat higher up on the vertical wall space. These decorations seem to have consisted of medallion-like heads, possibly portraits, neatly worked out in relief, and surrounded by roundish, relieved framework, embellished on the outer margin with ornate, rococo-like appendages; these are best given by Charnay, although something has to be allowed in this case, perhaps, for the personal equation of the artist who drew the illustrations on wood. Besides these features there are a few pole sockets here and there in the soffit slopes. While some of these features are peculiar to this particular building, the descriptions cover about all that is worth mentioning in the walls of the other members of the north end of the group. The arches vary somewhat in height and width. The other medial-wall doorways have the plain arch, and the window-

PL. XIX. VIEW IN NORTHWEST COURT OF PALACE SHOWING DECORATED PIERS
AND TOWER.

Looking to the southeast from the court we have the middle building at the left and the Tower beyond. Maudslay's men are seen at work uncovering the narrow stairway that ascends from the court to the middle building. Three of the piers are seen, bearing on their faces remnants of the stucco relief groups. Against the base of the Tower are remnants of an arch-pierced wall representing some structure not yet fully made out. Photograph by A. P. Maudslay.



VIEW IN NORTHWEST COURT OF PALACE SHOWING DECORATED PIERS AND TOWER.

like openings do not penetrate the wall but are closed with masonry, leaving shallow recesses only. The cord holders also vary somewhat, and the tau openings appear in cases as mere recesses in the walls. In one case, in the western building, near the north end, a window-like opening with angular, arched top penetrates the lower zone of the medial wall. It is 2 feet 6 inches from the floor and 2 feet 7 inches wide by 5 feet in height.

The northeast court measures 80 feet on the north, $72\frac{1}{2}$ feet on the south, 75 feet on the east and 80 feet on the west, the datum points used, however, being somewhat indefinite and unsatisfactory. Its depth below the floor level of the building is 6 feet. From this court five buildings are in view; on the north we observe the range A, much broken down, forming a mere ridge of debris; on the east the building B presents a façade entire save for breaches over the doorways; on the south the principal building, J, is much dilapidated, while the building I, presenting its north end, is well preserved, (see panorama). The façade of D, on the west side of the court is one of the best preserved in Palenque. There are stairways ascending to each of the buildings, five in all. These stairways do not extend the full length of the sides. Those on the east and west, and that entering the Mural Tablet Building, at the southwest, are constructed of hewn stone, while those on the north and south sides are of loosely laid masonry that must have been veneered with stone or finished in stucco. The walls at the sides of the stairways on the east and west are finished with panelings of hewn stone, on which are sculptured figures or glyphs. The large inclined stones flanking these stairways are covered with colossal and unique human figures in relief constituting one of the most interesting and novel features of Palenque. The steps on the west side have glyphic inscriptions on the faces.

The northwest court measures 30 feet on the north, 37 feet on the south and $74\frac{1}{2}$ feet from north to south. The datum points for these measurements, selected in haste, may differ from those selected by others. Its features and finish are much the same as those of the adjoining court, though some novel features appear at the south end. Several apartments, apparently of small size, seem to have existed in connection with the Tower, and a stair leads down beneath the north interior building, or between it and the Tower. It is possible that Mr. Maudslay, who must have carried on the extensive excavations observable in this court, has determined the nature and extent of the stairway and its connections.

The transverse section of the group, given in Fig. 51, bisects the terrace mass and shows the relation of the courts and buildings. The position of the sub-waterway is also shown.

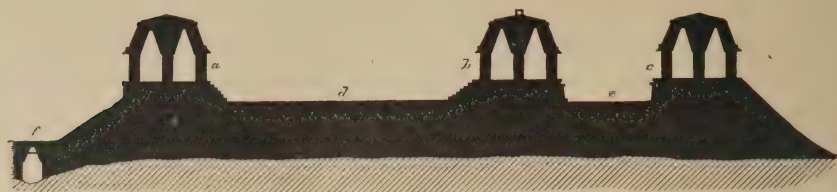


FIG. 51. TRANSVERSE SECTION OF NORTHERN END OF PALACE GROUP SHOWING BUILDINGS AND COURTS.

- a.* Eastern range.
- b.* Interior range.
- c.* Western range.
- d.* Great court (northeast).
- e.* Northwest court.
- f.* Waterway.

The dilapidated building (*J* on the map), separating the northeast court from the southeast space, extends from east to west and is about 42 feet long and 23 feet wide. It differs from the northern buildings in having its two vaulted galleries separated into chambers by heavy partition walls; three of these chambers are entered from the north and two from the south as shown in the plan. The middle room, entered from the north, occupies the full width of the building, the medial wall being penetrated by a wide, high archway, making the two sections coalescent. There are tau openings between adjoining rooms, and also one in the south end of the middle room. The southern rooms preserve traces of elaborate relief ornamentation, the principal remnant being a florid rococo-like design surrounding one of the tau openings. The ornament is richly colored, and is well illustrated by Charnay. In masonry, profile and finish this building is much like the others. The floor is apparently a few inches lower than the floors of its northern neighbors. The decay of the wood lintels has led to much breaking down over the doorways and the front half of the roof of the northwest chamber is gone. It is my impression that the narrow space between this building and the eastern range has been walled up and roofed over, though I made no very definite observations.

The building just described is joined on the west by another structure of exceptional interest (*I*). Part of its northern end is seen in the panorama. It extends from north to south, the north end connecting partially with the south end of the northern interior building. It could with propriety be called the southern interior building, but I prefer the title Mural Tablet Building on account of the handsome bas-relief imbedded in the wall of its west gallery. Its length is some 75 feet and its width 22 feet. The vaults are constructed as usual but

are not so high as in the buildings already described. The most unique feature of the building is its profile, Fig. 52. The upper zone of the wall is approximately vertical and the roof is nearly flat and without a crest. The section is, therefore, closely allied with the Yucatec section, and as this building is lower and more archaic looking than other equally well preserved structures, it is suggested that it may be the original type, from which the sloping roof form is a differentiation.

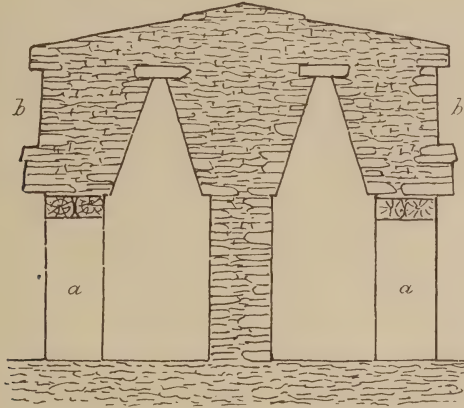


FIG. 52. TRANSVERSE SECTION OF THE MURAL TABLET BUILDING.

The upper wall zone is nearly vertical, thus suggesting the Yucatec profile.

a, a. Doorways with wooden lintels restored.

b, b. Steep upper wall-zone.

The roofless buildings of the southern courts call for but little attention. In the southeast court are the remains of a building, **K** on the map, that may be called the House of the Sanctuary; and another, **M**, of imperfectly defined character and extent, occupies the southwest corner of the farther court, **Q**, behind the Tower in the panorama.

I found the Tower to be a structure of unusual interest—largely because it is in many ways unique. It has been described in some detail by a number of authors, and some have ventured to illustrate its construction, but as these attempts at analysis seem unsatisfactory, I studied the structure with exceptional care and shall go over the ground as thoroughly as possible. It is a square building of four stories, three principal and one inferior, and has a stairway extending upward through the center of the four floors. It is seen in the panorama rising behind the northern interior building, and its height—suggestive of the feudal citadel—lends an air of the picturesque to the otherwise squatty and monotonous pile of ruins. It is in an

advanced state of ruin. The upper story is half gone; the doorways (more correctly windows) are broken out above, and the masonry has been denuded of the coatings of plaster and color that once made it an attractive feature of the group. It was probably an observatory, the upper windows and roof commanding a view of all the surrounding buildings. The construction is such as to strongly suggest this use. The stairway and windows are manifestly the main features. The inclosed spaces or galleries are only of sufficient width to serve as passageways from window to window and from stair to stair, the only exception being some small, dark chambers in the blind, second story. To be sure it may have been used for defense, and some ceremonial function may have been subserved, but the chief purpose was certainly that of an outlook.

It was much obscured by vegetation until cleared off by explorers, and full-grown trees still cling to its crags. The network of roots and vines with which it is held together bears evidence of the mighty vigor of the tropical forest.

This tower strikes me as belonging to the earlier stages of the growth of the Palace. Its foundation is as low or lower than the level of the courts, and it is enclosed on two sides by what appear to be later structures, built like honey cells against its sides.

The exterior is best described in connection with my drawing, Fig. 53, taken from the northeast—nearly the direction from which the top is viewed in the panorama. I have omitted the attached structures, which obscure the base on the north and west, and present the walls in their original simplicity. A photographic view from the northwest is given in Pl. XIX, which shows fully the character of the masonry, the windows and the inclosing remains, as well as the relation of the structure to the north interior building, at the south end of which it stands.

Rising from the body of the terrace we have the base of solid masonry, about 23 feet from east to west, and 25 feet from north to south, and perhaps 10 feet in height. The corners are enforced by slight masonry projections, and a wide, strong cornice incloses the top. Above this rise the other zones of the structure, each limited above by a narrow, square cornice and each in turn reduced a few inches in horizontal extent. There are thus six offsets, and these, with a very slight inward slope of the walls, narrow the top to about 16 by 18 feet.

Above the foundation space there are three narrow zones, entirely blank, and three wider zones containing the openings or windows. These wider zones mark the three principal stories of the build-

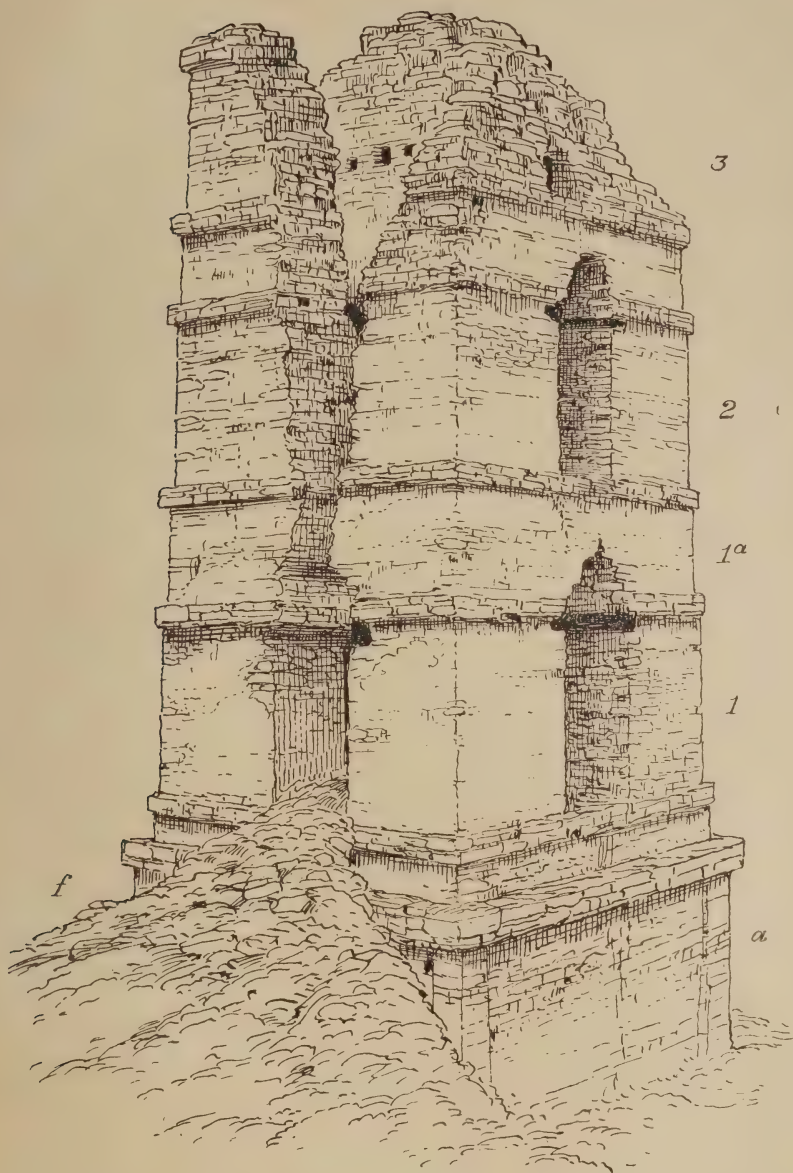


FIG. 53. SKETCH OF THE TOWER FROM THE NORTHEAST AS IT WOULD APPEAR DENUDED OF VEGETATION AND EXTRANEOUS MASONRY.

The base, upwards of 20 feet square, is believed to be of solid masonry. The stories are marked 1, 1a, 2 and 3. The height is about 40 feet. Masonry of smallish, slightly dressed stones and mortar. Surface, inside and out, plastered and painted.

For details of stonework and present appearance of structure, see Pl. XIX.

ing, while a blind story, having no exterior openings save minute air holes, occupies the space within the second narrow zone and just over the lower story. I was unable to determine which of the four lower story openings served as the doorway, as there are no traces of a stairway, but entrance may have been obtained from a cluster of constructions, remnants of which appear on the north and west sides. The roof of these constructions was apparently on a level with the floor of the lower openings. Entrance to the tower, (Fig. 53), is now obtained by way of the east opening, from which a heap of debris extends down to the terrace level. By climbing this debris slope we reach the first floor and find the space within largely occupied by the stairway, which ascends through a centrally placed square column of masonry; indeed the free space, by means of which we pass around the central column to the other openings and to the entrance of the stairway on the west side of the column, is nowhere over two feet wide. The construction and arrangement are fully shown in the section, Fig. 54; and the graphic section, Fig. 55, shows the first floor, with one of the corner piers of the structure removed.

It will be seen by reference to the ground plan of the first story, Fig. 56, that the corner piers are very heavy, measuring 5 feet and a few inches in thickness on the east and west sides and between 3 and 4 feet on the north and south sides, while the windows on the east and west are 6 feet wide, and on the north and south nearly 5 feet wide. The inclosed space is thus much limited, and the stairway column takes up 5 by 10 feet of this, leaving a passageway in places less than 20 inches wide.

The first flight of stairs is entered by a small doorway (*b*, Fig. 55) on the west side, and ascending a single step we enter a minute passage which extends to the center of the column, *e* on the ground plan, and from this we turn to the right up a flight of eight or nine steps,* landing on the second floor facing the south window, as indicated in the plan at *f* and in the section at *e*. The exterior characters of the stairway column and the entrance to the stair are well indicated in the graphic section, Fig. 55. In this illustration I have removed the near corner pillar (its position being indicated by the space shaded with dotted lines), and part of the pillar at the left, as well as a slice from the whole upper part of the building, the thickness of which is indicated by the dotted profile at the left. This lays bare the whole construction, exposing the central column, the windows with their wide jambs and wood lintels (restored to accord with the sockets which still exist), and the slab ceilings of the passageways. The height of the first story is about eight feet, interior measurement.

*Some of my sketches indicate nine steps from floor to floor while other sketches and notes show ten.

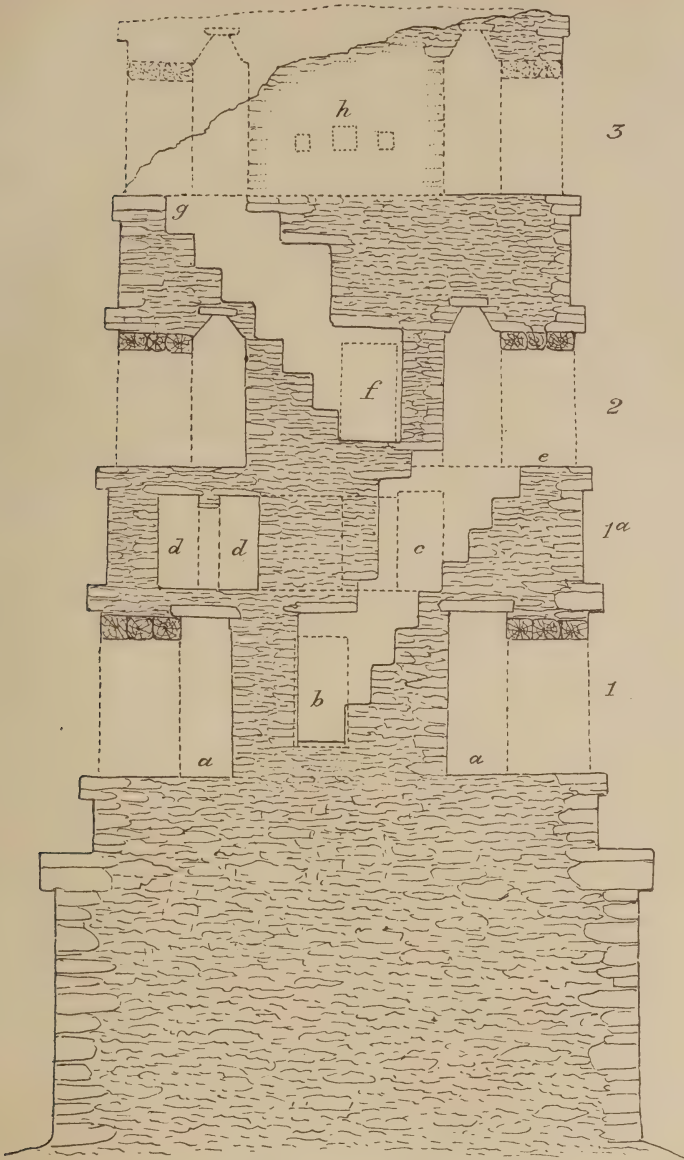


FIG 54. SECTION OF TOWER FROM NORTH TO SOUTH, SHOWING STAIRWAYS AND CONSTRUCTION.

The base is apparently a solid mass of masonry. The stories are marked 1, 1a, 2 and 3. The wooden lintels are restored to agree with the sockets.

- a, a.* First floor passage with doorways at right and left.
- b.* Entrance to stairway one step up from first floor.
- c.* Opening from fourth or fifth step of stair to blind story.
- d, d.* Passage and minute north chamber of blind story, position with reference to walls of Tower not fully defined.
- e.* Landing in south doorway (window) of second story.
- f.* Entrance to stairway of second story.
- g.* Landing on third floor, partially blocked by debris.
- h.* Small openings seen in east wall of stair shaft, third story.

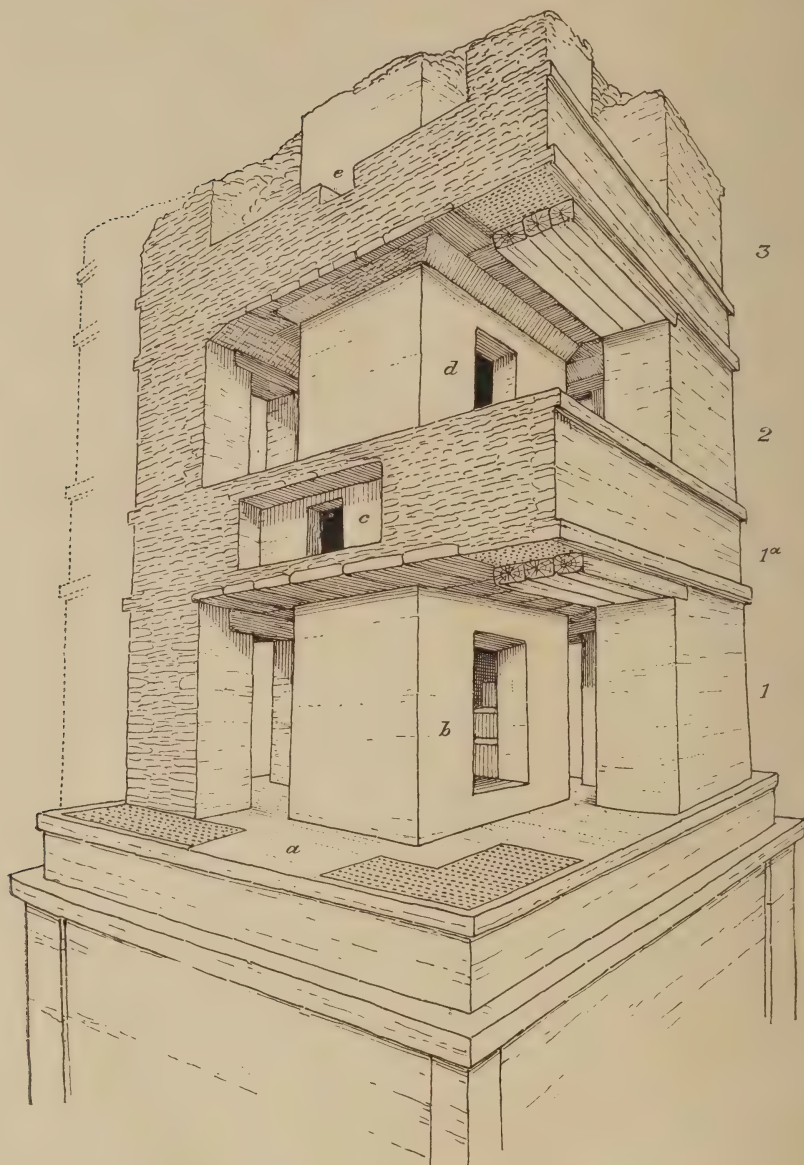


FIG. 55. PARTIAL SECTION OF TOWER EXHIBITING VARIOUS FEATURES OF CONSTRUCTION.

The stories are marked 1, 1a, 2 and 3. The wooden lintels are restored to agree with sockets. The near corner pier has been removed in the first and second stories to show the stair column, and a slice is taken from the whole north front above the first floor.

- a. First floor; dotted spaces indicate position of removed pier.
- b. Stair column with entrance to first flight.
- c. Minute north chamber of blind story.
- d. Second story, showing entrance to second flight of stairs.
- e. Landing of second flight of stairs on fourth floor.

In ascending the stairway, which is twenty inches wide and has masonry walls and a stepped or offset ceiling, we encounter on the left, at the fourth (or fifth) step, a side door, as indicated in the section; this leads to the most novel feature of the Tower, a blind story which occupies an irregular space about the stair column between the ceiling below and the floor above. The plan of the little cells of this story is given in Fig. 57. The height is about 4 feet 6

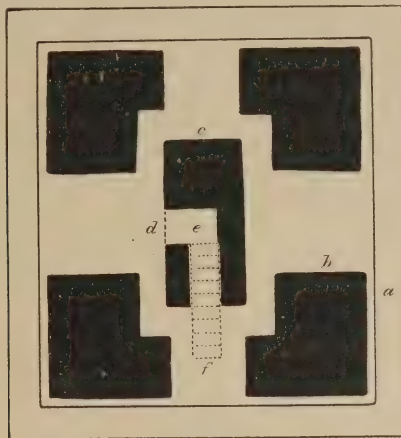


FIG. 56. GROUND PLAN OF FIRST STORY OF TOWER.

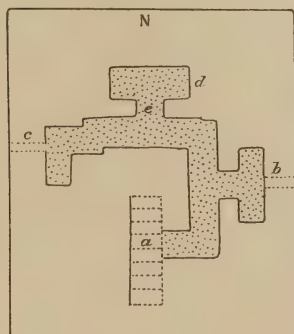


FIG. 57. GROUND PLAN OF BLIND STORY OF TOWER.

- a.* Entrance from fourth step of stairway.
- b, c.* Air holes.
- d.* Minute north chamber.
- e.* Doorway from passage to north chamber.

inches, and so far as I could determine no light was provided for, save that which came down the stairway from the south window and entered by the doorway at *a*. Naturally the northern and western extension of the minute gallery, which passes along the east side of

the column and around the north and west, was very dark, and the north chamber, *d*, entered from the gallery by a miniature door, *e*, had to be explored with a candle, though light is now admitted to some extent through a breach in the wall and floor of the passage over the east door of the story below. The door, which is 20 inches wide and some 45 inches high, and the chamber, which is only 2 feet wide and 4 feet 8 inches long, are shown in the graphic section, Fig. 55, at *c*.

The second story—or the third if we count the blind story—repeats the first story very closely and need not be described, save to indicate that the roof of the passageway is arched and not flat as in the lower story. In the latter, flat slabs were used because an arch would have taken up the room needed for the blind story, which has but 4 feet 6 inches of space as it is. The nature of the construction is clearly shown in the section. The height of the doorways is about 6 feet and of the ceiling about 7 feet. At this level the tower approximates 18 feet from east to west, and 20 feet from north to south.

The stairway to the third or top story is entered by a doorway (*d*, Fig. 55) in the west side of the supporting column, corresponding in position and appearance with the entrance on the floor below, and seven steps (width 26 inches, rise 16 inches, tread 10 inches) lead up to the landing at *e*. The ascent is to the north, the reverse of that of the lower stairs, so that the landing was in front of the third window on the north. The flat stones of the fallen roof of the top story now partially close the upper end of the stairway, *e*, and at the time of Stephens' visit closed it so completely as to lead him to believe that the stair passage ended here. Passing out of the debris-blocked opening I found that the upper story—that is to say the uppermost story of which traces now exist—was about half standing, though the roof had fallen in and the central or stairway column was covered by a mass of loose stones. It is impossible to say with certainty, without excavation, whether a third flight of steps, leading up to a fourth floor or to the roof, ever existed; but I found traces of three small openings in the north side of the column, (see Fig. 53), which may have served the purpose of lighting a stair passage, or, otherwise, a minute central chamber.

TEMPLE OF INSCRIPTIONS. Of the several isolated temples now standing in Palenque the Temple of Inscriptions (**B** in the panorama), is the largest and best preserved. It differs from the others in several particulars. The sanctuary has no tablet room, such as are seen in the other temples, and the great tablets, placed

two at the sides of the sanctuary door and one against the back wall of the sanctuary, contain only hieroglyphics. These are the largest and most important mural inscriptions found in America and are in the usual style of characters and in low relief.

The pyramid is 50 or 60 feet in height and stands so close to the southwest corner of the Palace platform that the adjacent corners seem to coalesce to a slight extent. The slopes are steep, reaching approximately 45 degrees, and are so covered with debris and vegetation that only small portions of the surface can be seen. A platform, some 12 feet wide, occurs near the top, and from this, midway in the front, a few steps of well hewn stone lead to the summit; at the sides of the stair are sloping sculptured slabs forming a kind of balustrade. The pile is long and narrow, and the building, as seen behind the Palace in the panorama, is set high against the dark forest-covered hillside. Other inferior structures, entirely hidden by the dense foliage, stand adjoining this at the west end.

The length of the building is 75 feet, the width 25 feet, and the full height probably between 25 and 30 feet. It faces north 14 degrees east, magnetic, which is a variation of 4 or 5 degrees from the orientation of the west wall of the Palace.

The walls are about 4 feet thick and the construction and finish are as usual. The profile corresponds closely with that of the north ranges of the Palace, and the roof-comb is similar to that of the northern interior building. Within are two great vaults, nearly 70 feet long and a little less than 7 feet wide. The front vault—the corridor of the temple—is entered by five wide doorways (seen in the panorama), and the three rear apartments, into which the back vault is divided, are entered by one doorway each. The exterior openings are square and were spanned originally by wooden lintels, while the inner are arched. There are no other openings, save a number of small squarish apertures piercing the outer walls. The floors are paved, in part at least, with slabs of limestone. The two important and striking features of this strange building are the stucco embellishments of the exterior, and the inscribed tablets within. The exterior decorations are mainly in stucco. The four free pillars contain on their outer faces, modeled in bold relief, life-sized figures of women holding children in their arms; while the wide lateral wall-fronts, or antæ, are covered with glyphs. The lower zone of the roof has been richly embellished with figure subjects, now nearly obliterated, the effect having been varied by decorated projections over each doorway. The upper slope and the roof-comb show no decorations. These various features are but imperfectly indicated in the panoramic view.

The inscribed, limestone tablets, occupying the back walls of the vestibule and sanctuary, are well presented in the work of Stephens. His plates bear witness to the courage and patience of Catherwood, and to the remarkable accuracy of his pencil. They have been further brought before the world by the excellent casts of Charnay, now found in numerous museums.

TEMPLE OF THE BEAU RELIEF. Leaving the Temple of the Inscriptions we descended to the bed of the creek at the corner of the Palace and, following one of its dry freshet-cleared channels, thus partially avoiding the undergrowth, soon obtained a view of the small but interesting Temple of the Beau Relief, which is hardly more than 500 feet from the south end of the Palace, and is seen in the panorama at C. The stream runs hard in against its west bank at this point, cutting into the limestone beds beneath the ruin; and less than 100 feet farther down it sinks gradually out of sight, finding its way into the clogged upper end of the ancient, arched waterway. The forest-clad hill rises at a steep angle and is covered with debris from the ruin which is perched upon a narrow ledge built against the precipitous slope some 75 feet above the stream. This ledge or shelf, which took the place of a pyramid, was not more than 25 or 30 feet square, and was probably faced with stone on front and sides; and doubtless a stairway led up the middle from the stream bed or from a horizontal roadway or terrace now obliterated. The temple was about 20 feet square and was entered, according to early drawings, by a single square doorway; from this, with the forest cleared away, a fine view could be obtained of the temples opposite and the valley below. It faces east, varying but two or three degrees from the magnetic orientation. The breaking down of the substructure at the outer margin has undermined the façade and this and portions of the lateral walls have fallen, leaving the ragged edges of the end walls and roof exposed. At the left in the crumbling mass of the terrace, a small basement room is partially exposed, and above we see the inner wall of the vestibule, vertical and plain below and sloping forward above, indicating the usual vault. In the center of this wall is the squarish doorway leading into the sanctuary or tablet chamber. The lintel, which was probably of zapote, is gone and the wall is cracked above; but the jambs are well preserved and are faced each with the remnants or imprints of two vertical rows of stucco glyphs.

The sanctuary is an arched chamber of usual construction and appearance. It is 6 feet 2 inches wide and 17 feet long. The walls are 8 feet high to the spring of the arch, and retain their plastered surface in part only; they are 2 feet 2 inches thick and have several

small squarish perforations. The sloping upper walls are pierced with beam sockets as usual.

The various constructional features are well shown in the accompanying section, Fig. 58, though the profile of the roof is not very definitely made out.

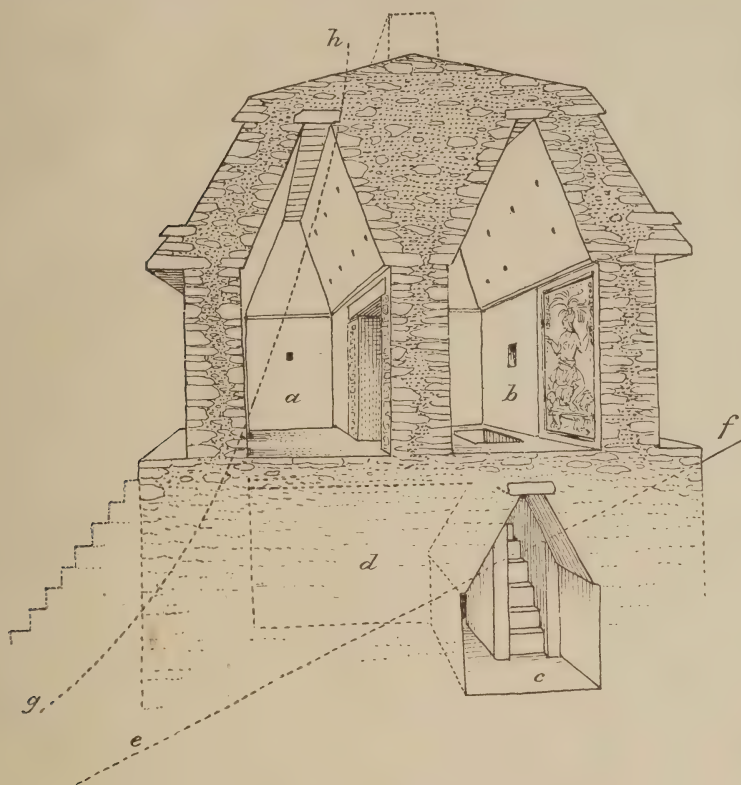


FIG. 58. SECTION AND PERSPECTIVE OF THE TEMPLE OF THE BEAU RELIEF.

- a.* Vestibule showing entrance to sanctuary bordered by glyptic inscriptions; wooden lintel restored.
- b.* Back vault or sanctuary showing the Beau Relief and entrance to basement stair.
- c.* Basement chamber at foot of stair, north extension.
- d.* East extension of basement chamber.
- e-f.* Slope of mountain side.
- g-h.* Line indicating portion of front of building destroyed.

A remarkable feature of this building is the basement apartment and the stairway leading down to it through the floor of the sanctuary, as indicated in the illustration. There are seven steps, each with 15 inches rise and 8 inches tread. The principal chamber corresponds in length and width with the sanctuary above, but is only 7 feet in height and is partially occupied by the stairway. A small vault

extends from this apartment forward under the south end of the vestibule. The plans given by Bancroft are correct in nearly every particular.

The most interesting feature of this temple was a stucco bas-relief—taking the place of the limestone tablets of other temples—the remnant of which occupies the middle of the back wall of the sanctuary, opposite the doorway. Charnay states that the relief is entirely obliterated, but I find that nearly one-third remains and affords an opportunity of determining the nature and style of the work. The subject, as depicted by Waldeck and reproduced by Bancroft and others, consists of a single figure, nearly life size, seated in a graceful pose on a throne which terminates at the right and left in tiger heads, the conventional, angular seat being supported by two legs modeled to represent the feet of the animal. I consider it a piece of great good fortune to have had the opportunity of examining the remnant of this remarkable masterpiece, and take especial pleasure in testifying, so far as a study of the fragment will warrant, to the accuracy of the descriptions and drawings published by some of the early explorers. No part of the human figure remains save perhaps a bit of the right knee, and the tiger heads are nearly all gone; but, with the engraving published by Bancroft in my hand, I studied the remains of drapery and the modeling of the animal features of the chair with great minuteness, finding the drawing absolutely accurate save that the artist has not caught, or the engraver has failed to preserve the full spirit of the work. The drapery is modeled in a masterly way and the subtle lines of the foot and claws of the cat are forcibly suggested. I must acknowledge having harbored a feeling of skepticism, awakened years ago, as to the truthfulness of Waldeck's drawing. I believed that the graceful pose of the body and limbs of the figure, the flowing yet vigorous plumes and drapery, and the refinement of the relievo modeling, were beyond the reach of native skill, but having seen what is left of the original I am willing to accept the drawing of Waldeck as an excellent interpretation if not an entirely satisfactory copy of the work. While there is certainly some loss of native character and force there is probably also a little over-refinement of drawing and finish, natural enough in the work of an accomplished artist not deeply impressed with the importance of scientific accuracy. The illustration of the same subject published by Dupaix is, in my opinion, hardly above the rank of a caricature. A photographic reproduction of the lithograph published by Waldeck is presented in Pl. XX.

As a work of art this bas-relief would not suffer by comparison with representative relief sculptures of Egypt, Babylonia and the



STUCCO ALTAR-PIECE KNOWN AS THE BEAU RELIEF. AFTER WALDECK

far East, and in balance of parts and grace of line has few rivals. The right hand of the figure is extended as if to call attention to the inscription toward which the face is turned, while the left hand is raised, the index finger pointing upward.

The imprint of portions of the figure still remains upon the wall, and the remnant as it stands affords an excellent opportunity of studying the technique of the worker in stucco. The roughly laid up wall was covered somewhat evenly with plaster, then as the modeling advanced, if the relief was high, bits of stone were set in, making a framework for the prominent features. Where strong projecting portions were to be added shallow pits were dug in the masonry as sockets for the projecting stones. Mortar was then carried over all, rough shaping the form; perfection of modeling was made possible by employing finer grained mixtures, and finish was given by polishing and painting.

Of the two lines of inscriptions three glyphs remain nearly intact—the second from the top at the left and the third and fourth from below on the right. Outlines of others are seen as indicated by Waldeck. The glyphs were modeled separately and set, after hardening, into the bed of soft plaster.

The inclosing framework of the picture is neatly executed, though it has not quite the mechanical precision indicated by Waldeck. It is $3\frac{1}{2}$ inches wide, save at the base, where it is about 6 inches wide, and the inside measurement is 73 inches horizontally and 90 inches vertically. Its relief is $1\frac{1}{2}$ inches. A rough hole in the wall, behind the point of the right elbow of the figure, probably had nothing to do with the relief and may be of recent origin.

EAST SIDE REMAINS. On the east side of the channel of the Otolum we have an interesting group, consisting of three well preserved temples and several mounds some of which retain remnants of walls. In the panorama they are at the left and occupy a system of terraces from 30 to 50 feet in height that rises abruptly from the stream level and extends back some four hundred feet to the base of the mountain spur. The three main temples face a depressed, squarish space a few hundred feet wide, which has near the center a heap of stones representing some small structure. This space may have served as a court in which were conducted ceremonies pertaining to the temples. This arrangement is repeated on two terraces rising one behind the other to the south; the front line of structures is thus separated from those set against the base of the Cerro. Owing to the position of the buildings, only rear views of the Temples of the Cross and Sun are obtained in the panorama, while the broken façade of

the third—the Temple of the Cerro or Cross No. 2—is barely visible beyond the Temple of the Cross.

TEMPLE OF THE SUN. This temple is one of the best preserved of the Palenque buildings and may be presented in some detail as a type of its class. It is inferior in size and architectural pretensions to the Temple of the Cross, but resembles it closely in every important particular. The pyramid is hardly more than 20 or 25 feet in height and is so close to the terrace front that its outer slope coincides with that of the terrace. A mound of inferior size adjoins this on the north and annexed piles extend toward the Temple of the Cross; while a larger pile rises on the south, and still another occupies the margin of the terrace opposite the Temple of the Beau Relief. In most of these mounds traces of ruined walls are visible. In the panoramic view we see the north wall and the west or back wall of the Temple of the Sun. The front elevation, facing the east, is shown in Pl. XXI; the view is reproduced from a photograph very kindly placed at my service by Mr. A. P. Maudslay. This energetic and successful explorer has in preparation a paper on Palenque, to be accompanied by many of his superb views, which will undoubtedly be by far the most important contribution to the world's knowledge of these remains. An excellent illustration of this building is given by Charnay, and Stephens and Waldeck have furnished very careful drawings. The building is 38 feet long by 28 feet wide, and the full height, including the roof-crest, is about 35 feet. The walls are about 3 feet thick and rise vertically to the height of $10\frac{1}{2}$ feet. The interior comprises the usual pair of longitudinal vaults, each between 9 and 10 feet wide and a little over 20 feet high. The soffit surfaces, sloping in from all four sides, rise at an angle of about 70 degrees, and the capstones forming the ceiling are exposed to a width of 2 feet.

The front vault—the vestibule of the temple—is shown in the sketch (Fig. 59) as it would appear if the end wall at the south were removed. The floor is now much obscured by debris but appears to be surfaced with cement. At the right are the three doorways, separated by two squarish piers. The middle span is much broken down above, but the lintel sockets are still visible and I have restored the timbers that the construction may be better understood. The exact present condition is shown in the photograph, Pl. XXI. The outer faces of the piers were covered with stucco figures and glyphs, as shown in the view, but the interior surfaces are all plain. At the left are three doorways, perforating the thick medial wall which separates the front and back vaults. The middle opening gives entrance to the sanctuary, and is about 8 feet wide, and being arched above

it extends high up into the massive masonry of the upper wall. Smaller doors, of like construction, but confined to the lower wall-zone, occur at the extreme ends of this wall and afford entrance to the two antechambers adjoining the sanctuary. Over the north doorway perforating the soffit slope is a coffin-shaped opening resembling

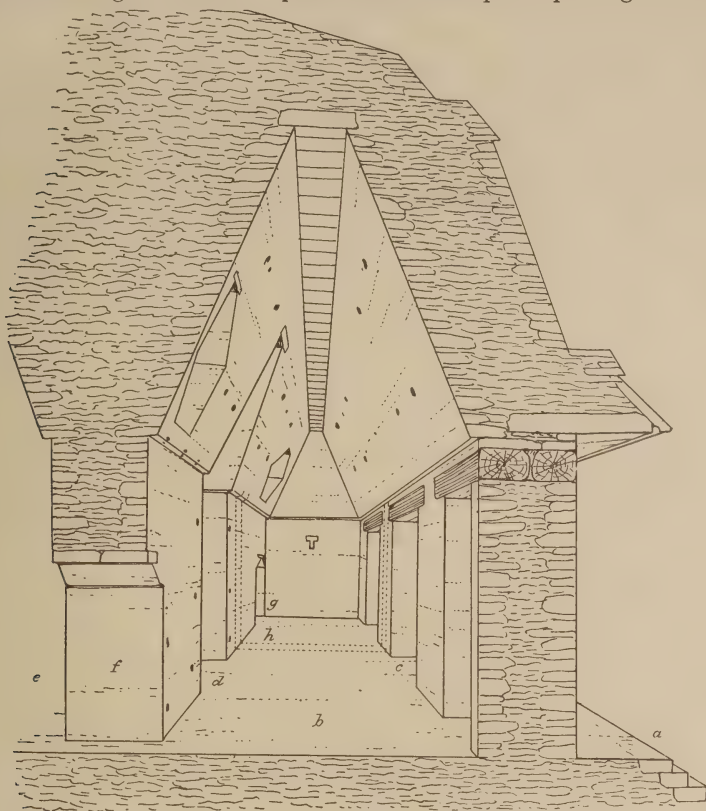


FIG. 59. SECTION AND PERSPECTIVE OF OUTER VAULT OR VESTIBULE, TEMPLE OF THE SUN; LOOKING NORTH.

- a.* Stairway, east front.
 - b.* Floor of vestibule.
 - c.* Middle doorway with wooden lintel (restored).
 - d.* Doorway to sanctuary; cuneiform arch.
 - e.* Back vault (see Fig. 60).
 - f-g.* Doorways to antechambers.
 - h.* Traces of partition wall, indicated by dotted lines.
- Other features as usual.

the corresponding features in the Palace, already described, and another like opening over the south door has been closed by masonry. Above we have the soffit slopes, narrowing up to the capstones. The farther end of the chamber has a tau-shaped opening of usual style,

and another occurs in the south end. The plastered walls are further broken by pole sockets scattered over the soffit spaces, and by numerous dumb-sheave cord holders, some built into the walls at the

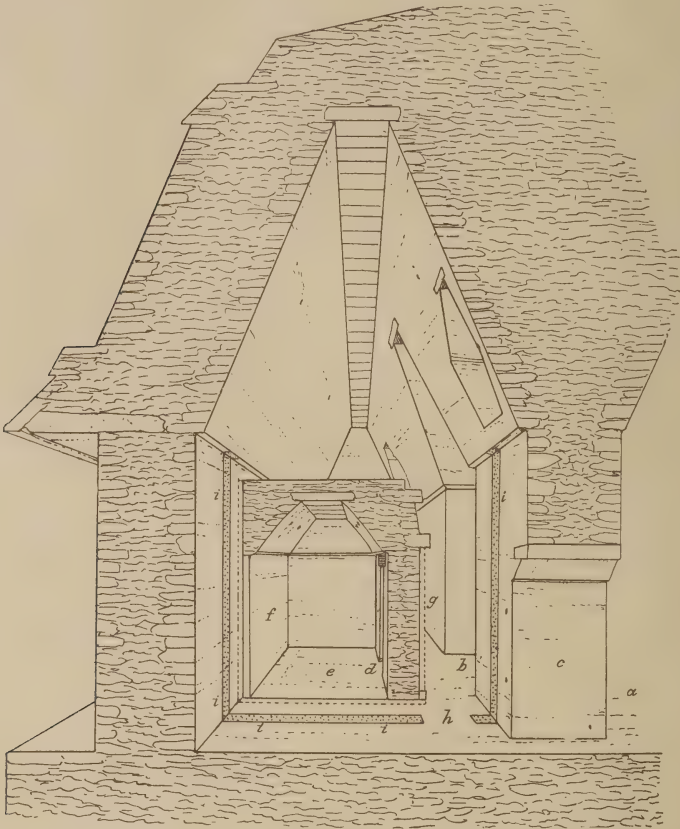


FIG. 60. SECTION AND PERSPECTIVE OF BACK VAULT (SANCTUARY AND ANTEROOMS)
TEMPLE OF THE SUN.

- a.* Front vault or vestibule (see Fig. 59).
- b.* Doorway connecting vestibule with sanctuary.
- c.* Lateral doorway connecting vestibule and antechamber.
- d.* Doorway into tablet chamber.
- e.* Floor of tablet chamber.
- f.* Sacred tablet. (See Pl. XXII.)
- g.* Dotted vertical line indicating former position of antæ relief.
- h.* Doorway through partition.
- i-i.* Partition wall separating sanctuary from antechamber, omitted to give view of tablet room, the near end of which is also removed to expose the interior.

sides of the doorways and others perforating the projecting edge of the offset at the spring of the arch. Just beyond the main doorway are traces of a thin partition wall that must have separated the vesti-

bule into two sections of unequal dimensions. The walls of this, as well as of the other apartments, are quite rough and much coated with calcareous deposits distributed by percolating waters.

In Fig. 60 I present a section and sketch of the back vault, the southern wall being removed to give necessary distance and exposure. Also the partition wall—indicated by dotted lines—separating the south antechamber and the south end of the box-like tablet room, are omitted, so that the construction of all the peculiar features may be apparent.

The tablet chamber is placed against the back wall, the tablet appearing at *f*. It is arched as are the greater chambers, and has its pole sockets and dumb-sheave cord holders as do the other vaults. The center of the floor, *e*, has been dug up by some explorer, probably Del Rio. The doorway, with lintel restored, appears at the right, and outside, penetrating the medial wall, is the great arched doorway to the vestibule.

The front of the tablet chamber is the only part that has received any particular attention from the decorator, but the breaking out of the doorway above has nearly destroyed the handsome stucco over-door design; and the sculptured tablets that formerly faced the exterior of the door jambs have been removed, leaving only the plaster beds with their roughened surfaces as prepared by the workmen who set the tablets. An excellent representation of this curious façade is given by Stephens*; the two jamb tablets are in place and portions of the beautiful tablet are seen within. The over-door ornament, of which small portions remain at the right and left, probably embodied a pair of the peculiarly conventionalized serpent devices characteristic of Usumacinta art. The roof is flat, the height is 10 feet, the width 6 feet and the length 11 feet. The ground plan is shown on the accompanying map.

The exterior features of the building are shown in Pl. XXI, but deserve brief review. The two free piers, separating the portal into three sections, retain fragments of the stucco figures which formerly covered them; and the side piers, or antæ-fronts, have been occupied by glyphs, two examples of large size and elaborate design still retaining their places on the left-hand pier. The ends and back wall present plain, rather roughly plastered surfaces, varied only by the minute window-like openings. There is a projection of masonry at the floor level, and below this the wall faces, where exposed, descend vertically. The eaves, which correspond to the medial wall-molding of the Yucatec buildings, are very pronounced and bold, projecting 3 feet and retreating above at a sharp angle, thus connecting

* Incidents of Travel. Vol. II, facing page 354.

gracefully with the steep slopes of the roof. This great projection is secured by setting large slabs upon the top of the walls and facing the sloping, outer surface with a course of rather roughly hewn stones as shown in some of my sections. The outer margins of the eaves-slabs are perforated at intervals of a few inches by holes for cords, intended no doubt for supporting awnings or screens.

The roof of this building is of great interest. Its conformation suggests the mansard of our domestic architecture, the profile being nearly uniform on the four sides and receding in two principal stages. The wide lower slope, corresponding to what I have called the entablature zone in Yucatec buildings, pitches back from the eaves-moldings at an angle perhaps a little greater than that of the arch soffit within. It is about 7 feet wide and is bordered above by a second but less pronounced set of moldings corresponding to the frieze or coping moldings of the Yucatec buildings. These also incline backward and are followed by the upper or roof-space proper, which is about 6 feet wide at the sides and extends back at a very low angle to the base of the roof-comb.

The upper sloping space seems to have remained plain, which is reasonable, as it would not be in sight from any available point of view; but the lower zone has been embellished all the way around and furnishes one of the most remarkable illustrations extant of the ambition and ability of the Maya decorator. The subjects, undoubtedly mythologic and germane to the functions of the temple, were wrought out in stucco in high, round relief, and—though now badly broken up—enough remains to show that they were analogous in character to better preserved, though less pretentious, examples of the same class. The style is even more florid than usual. On the east side or front (Pl. XXI), we detect the form of a serpentine monster covering nearly the entire space, 21 feet long by 7 feet wide, with other figures and appendages filling the interspaces. At the right is the figure of a man kneeling upon a framework, beneath which are traces of a grotesque face of large size, with bulging eyes, reminding one of the wild-eyed monsters of some of the Javanese ruins. The border of this great panel, formed of the lower and upper moldings and the sloping corner pieces, was no doubt furnished with appropriate, conventional ornaments.

The roof-comb which, as it stands to-day, is well shown in Pl. XXI, consists of a very narrow vault, extending the full length of the roof, and is 2 feet wide within and 12 feet high; it is open at the ends, and the section resembles that shown in Fig. 64. The walls are 3 feet thick below and 2 feet or less above. They incline together

PL. XXI. TEMPLE OF THE SUN; FROM THE EAST.

Four noteworthy features of this structure are the pyramid, some 25 feet in height, the vertical wall with its three doorways, the sloping roof in two zones, and the perforate roof-comb. It is apparent that the middle doorway—much broken down above—is considerably wider than the others. Remnants of stucco figures and glyphs occur on two of the piers. The elaborate stucco designs of the principal roof-zone are imperfectly seen, and those of the roof-comb are nearly all gone save on the west side. Photograph by A. P. Maudslay.



TEMPLE OF THE SUN; FROM THE EAST.

at a slight angle and are connected above by the usual offset arch in miniature. They are perforated in a varied and striking manner and were finished at the top with a slight molding. The masonry is well built of rather small stones set in mortar, and the openings, when close together, are separated and spanned by dressed slabs.

The faces and ends of this strange comb were entirely covered with bold designs in stucco, and it is apparent that it was built for no other purpose than to serve as a framework upon which to model these mythologic tableaux, and to add to the beauty and effect of the building. I have sought to determine the motive that led to the openwork construction. Was it a method of reducing the weight of the wall which, built solid, would greatly increase the strain upon the vaults? Or was it thought that the effect of the openwork behind the sculptures was especially pleasing? The latter is, perhaps, the more reasonable; but there may have been some phase of barbarian ceremony for which the openings were utilized.

The mechanical skill displayed in the construction of these roof-combs is worthy of note. It was not difficult to model the reliefs upon the sloping surface of the roof or on the lower walls, but it would be difficult to fix scaffolding against these roof-combs. It may be that the latticework walls were utilized in this work. It would be easy in building, or in repairing and painting the stucco groups, to place projecting timbers through the openings and attach poles to the ends of these for workmen to stand upon.

As to the manner of attaching the figures and ornaments to the masonry, and building out the relief in plaster, I made particular observations. In other places small stones were set into the wall surface, projecting sufficiently for the attachment and support of the applied work, and the same is true here to a large extent; but much dependence was placed on the strength and adhering properties of the plaster, the stonework skeleton being attached by this means to the framework of the comb. To illustrate the construction, I reproduce, in Fig. 61, a sketch of a partially demolished human figure of colossal size which occupies the middle portion of the comb near the top on the west side. The head, which is nearly gone, was fixed to the cornice and was built up of a number of rough stones to approximate the shape; the features were then modeled over this, and it is probable that ornaments were carried up over the cornice. The neck and body are attached to the upright partition behind, and the arms were supported by the horizontal slabs at points of crossing. Plaster was used to fix the long pieces of stone to the framework and the arms were modeled on these. The strips of stone were shaped



FIG. 61. SKETCH SHOWING MANNER OF BUILDING UP STUCCO FIGURES AGAINST THE OPEN-WORK ROOF-COMB.

for the purpose by sawing up thin slabs of limestone, and one of the pieces is shown in Fig. 62. The appearance of the sawed surfaces indicates that the saw was of primitive form, and there is no reason to suppose it was not made of stone. The body of the figure is partially preserved and displays portions of a tastefully modeled belt and ornaments. The figure is seated cross-legged on the medial course of the comb stonework, and the hands probably rested on the knees. Portions of a neat ornamental framework appear at the sides, passing around the six apertures behind the figure.

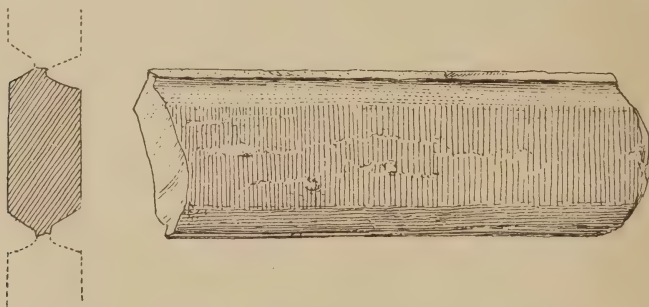


FIG. 62. SAWED STRIP OF LIMESTONE USED IN BUILDING SKELETONS OF STUCCO FIGURES. THE SECTION INDICATES THE SAWING FROM OPPOSITE SIDES. ONE-FOURTH ACTUAL SIZE.

TEMPLE OF THE CROSS. This temple is a prominent feature of Palenque and has received more attention from explorers and writers than any of the other buildings. It appears at the left in the panorama, but as it faces the south only the back and west end are in view. The position and general conformation of the structure are, however, well made out. From the bed of the stream, which is at this point a hundred or more feet wide (though waterless, save in periods of freshet), the supporting terrace rises to the height of 30 or 40 feet and extends back to the foot of the hill, as already described.

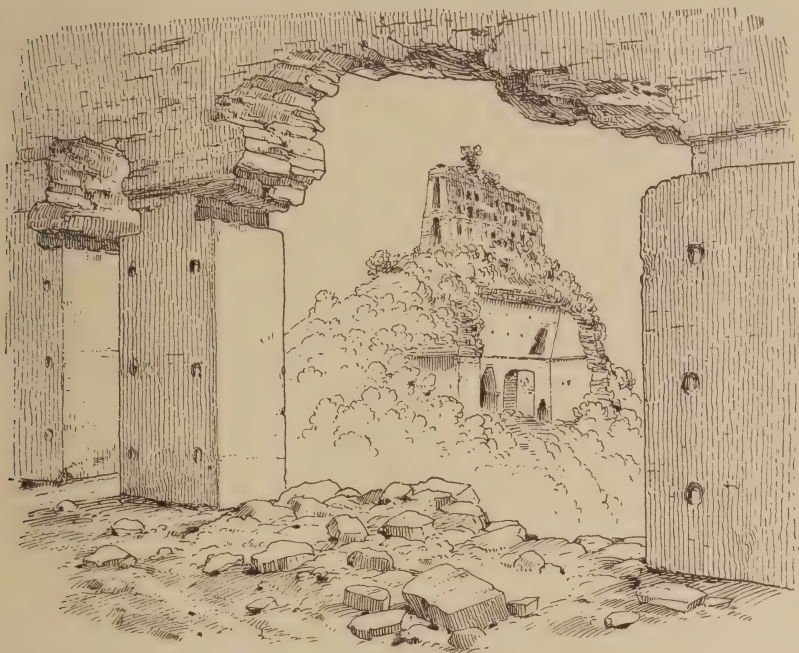


FIG. 63. SKETCH OF TEMPLE OF CROSS FROM TEMPLE OF SUN, SHOWING BROKEN DOWN FRONT OF FORMER.

The pyramid sets back perhaps a hundred feet from the front and rises at a steep angle to the summit, which is barely large enough to accommodate the temple, 31 feet from north to south and 48 feet from east to west. The building faces south 25 degrees west, and thus corresponds closely in orientation with the Temple of the Sun. The surface of the pyramid is entirely buried in debris and covered with dense and tangled undergrowth, and little could be determined of its character. Illustrations given by Stephens indicate a stairway all around. The Temple, including the roof-crest, is about 42 feet high, and is much like the Temple of the Sun in nearly every important

respect. The façade is broken out and, as indicated in a sketch made from the Temple of the Sun, Fig. 63, the back wall of the vestibule, with its soffit slope, doorways and ornamental openings, is exposed. The side walls, or antæ, are broken down to some extent and only one of the two intra-portal pillars remains in place. The exterior walls and roof, save at the front, are well preserved, and the perforated roof-comb, though stripped of its decorations, is almost entire.

The medial wall, separating the outer corridor from the rear gallery, though now fully exposed to the action of the elements, still preserves much of its plaster surface which, as in many other cases, is held in place by coatings of calcareous matter, deposited by percolating water. It is pierced by a great archway 18 or 19 feet in height and a little over 9 feet wide. The walls below are 4 feet 2 inches thick, and at the top of the arch the distance through is 10 or 11 feet. A remarkable feature of this arch, a feature seen also in one or two other temples, is the occurrence of a thin wall connecting the opposite faces of the vault as if to hold them more firmly in place. The lower margin of this wall which may have been supported by a wooden beam extending from side to side, or by an arch, is broken out. This great doorway gives entrance to the sanctuary. At the ends of the medial wall are two smaller doorways, leading to the two lateral chambers behind. These doorways are of usual arched construction and do not reach to the spring of the chamber arch, but above each, in the soffit slope, are sub-trefoil openings, corresponding closely with those in the Palace. They are 5 or 6 feet wide at the base and about 6 feet high. The vestibule walls have the usual beam holes above, cord holders at the offset of the vault and at the sides of the doorways, square openings between the doorways, and tau-shaped perforations in the end walls.

An examination of the remnants of pillars and antæ fronts show that they were decorated with stucco reliefs, as in other buildings. The vestibule extends the full length of the building, and its vault is about 9 feet wide and 20 feet high. The walls are of usual thickness and construction, as indicated in the accompanying section, Fig. 64.

The rear vault is divided into a long middle chamber and two narrow lateral chambers. The latter are entirely plain, save for tau openings, while the former contains the tablet room built against the back wall and arched and roofed as are the buildings proper (see section). The doorway of the room is broken out above thus destroying all but the outer extremities of the stucco devices that decorated the entablature. The spaces at the sides of the doorway

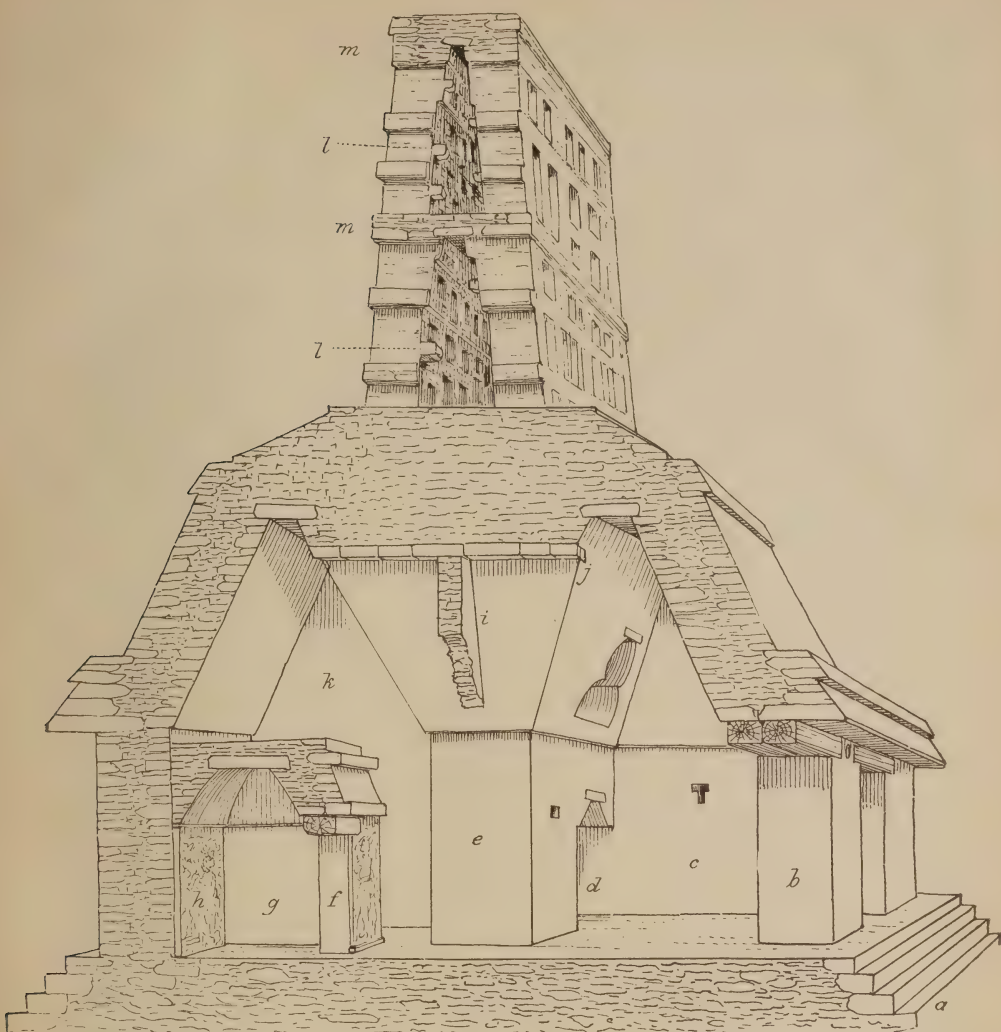


FIG 64. TRANSVERSE SECTION THROUGH MIDDLE OF TEMPLE OF THE CROSS, SHOWING PERSPECTIVE OF EAST HALF OF BUILDING.

The wooden lintels and portions of the facade are restored.

- a.* Stairway facing south.
- b.* Pillar (restored) separating middle and east entrance.
- c.* East end of front vault or vestibule.
- d.* Doorway to east anteroom.
- e.* Great doorway connecting front and back vaults.
- f.* Doorway to tablet chamber, lintel restored.
- g.* East wall of tablet chamber.
- h.* Former position of tablet of the Cross.
- i.* Arch brace of masonry.
- j.* Ceiling stones of doorway arch.
- k.* Partition wall separating sanctuary from east anteroom.
- l.* Steps (projecting stones) for ascending through openings in middle floor and roof.
- m, m.* Middle floor and roof of comb.

show the roughened plaster beds from which the two sculptured tablets, probably those now set in the church wall at Santo Domingo del Palenque, were torn away.

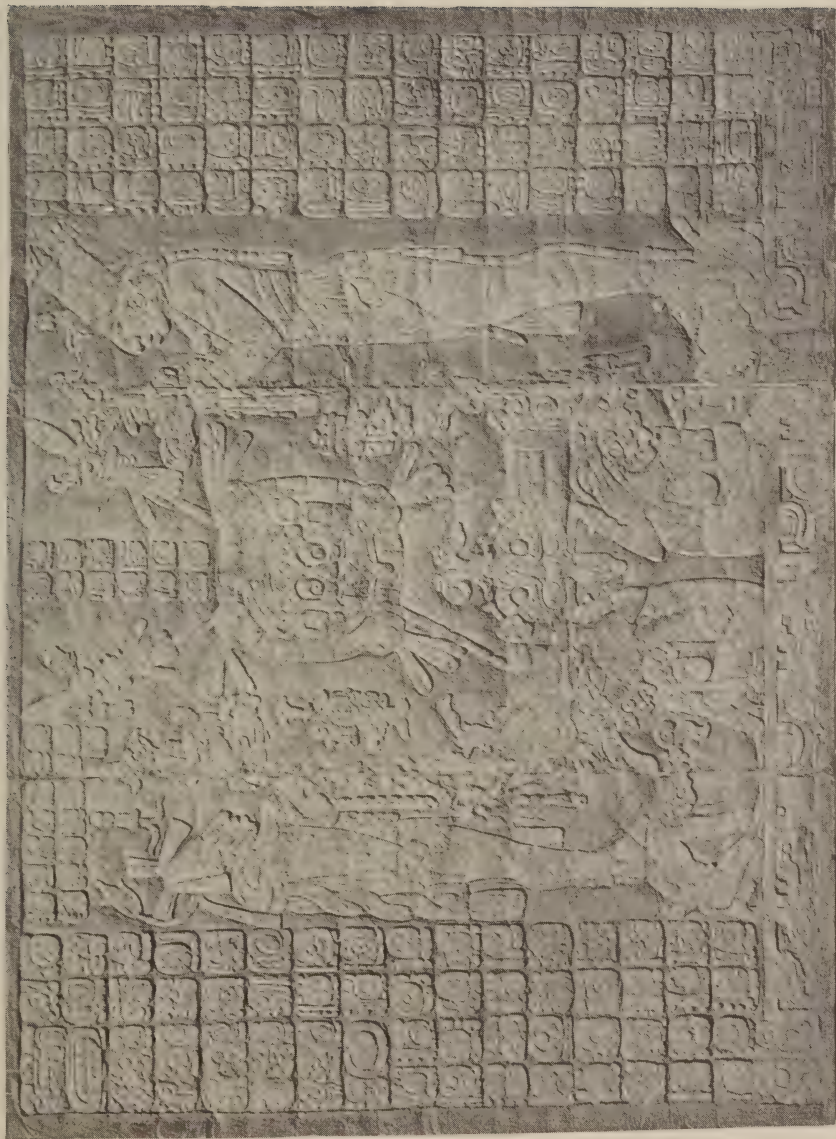
The back wall in like manner indicates the position of the tablet of the Cross, now preserved, the main part in the Museo Nacional, Mexico, and the smaller section in the National Museum at Washington. The floor space of the tablet room is 6 by 10 feet. The height of the walls is 6 feet 3 inches, and of the vault—which inclines inward on all sides, and with a very slight curve—is 8 feet 10 inches.

The profile of the roof of this building is seen in the section, Fig. 64. The lower cornice (the eaves) is very bold, projecting 24 inches on the under side, and consists of two members both sloping backward on the outer face with the pitch of the roof. The lower roof space slopes (approximately) with the vault within and shows traces of rich stucco decoration. The upper molding and the roof slope above are narrow, and a level space, 18 inches wide, surrounds the base of the roof-comb.

The roof-comb is a most striking feature, and, when covered with its intricate and elegant stucco designs, must have presented a most unique and attractive appearance. It is 8 feet wide at the base, 36 feet long, 18 feet high, and 6 feet wide at the top. The walls are from 2 feet to 2 feet 6 inches thick and inclose two narrow galleries, of usual construction and profile, one above the other and extending the full length of the comb. The ends are open. The walls are perforated in a much varied manner and served to support the decorations which were fixed to them, as in the Temple of the Sun already described. The accompanying section shows the character of the masonry and profile, and indicates the position of a number of projecting stone steps, by means of which it is possible to ascend through square openings in floor and roof masonry to the level roof. The lattice wall is carefully built, for the most part of small stones, though large slabs are used where necessary as sides and lintels to the openings. The corners are rounded and surfaces are generally covered with plaster which has a light salmon-gray hue.

TEMPLE OF THE CERRO. This ruin was called the Temple of the Cross No. 2 by Charnay, for the reason that it contains a superb tablet quite perfect in every particular and nearly identical with that of the Temple of the Cross. It is in a somewhat more advanced state of demolition than the better known temple, and is placed against the base of the cerro or hill a little beyond that temple and facing the Temple of the Sun.

It is seen in the panorama almost behind the Temple of the



SANCTUARY TABLET WITH SCULPTURES IN LOW RELIEF. TEMPLE OF THE SUN.



Cross. The pyramid is perhaps 25 feet high on the front and is set against the hill so that there is no depression behind. The façade, which faces west 35 to 40 degrees north, is broken down so completely that no traces of the pillars or antæ remain, though portions of the end walls still stand, and the back wall of the vestibule—the medial wall of the building—is complete. The length is 42 feet and the width was from 30 to 33 feet. The ground plan is essentially the same as in the other members of the group and the walls correspond in thickness, masonry and finish. The exterior openings were doubtless three in number, and the doorways into the back vault are the same as in the Temple of the Cross. The doorway at the left has been reduced in size by adding a thin masonry jamb at the right, and a second jamb has been built out from the opposite side of the passage, just within the chamber, thus giving a narrow and crooked entrance. Tau openings, cord holders and beam sockets occur as usual. The trefoil openings in the medial wall are present, but differ somewhat in shape from other examples, the upper part being more constricted laterally. The back vault is divided into the sanctuary and two narrow side rooms. The tablet room within the sanctuary corresponds closely with that of the Temple of the Cross; the decorated entablature is broken down in the same way, and the tablets that formerly faced the lateral piers or antæ have been removed. The roof of this temple is considerably broken down and only the base of the roof-comb remains.

Beyond this temple to the south, and set in like manner against the base of the cerro, are several other ruins the superstructures of which are almost wholly destroyed.

Before passing on I may mention the occurrence of a considerable pile of ruins situated near the margin of the terrace in front of the Temple of the Cross and just north of the Temple of the Sun. It seems to have comprised two or three somewhat independent structures, and traces of walls are visible.

In Pl. XXII I present an illustration of the sanctuary tablet of the Temple of the Sun. It is copied from a Charnay cast, now in the Museum, but it does scant justice to the original work. In design and execution this specimen is not equal to the two tablets of the Cross but it will serve to indicate the general style of the work. The figures of priests are in good proportion and the lines are refined and expressive, but the action is less free than in some of the stucco groups of the palace pier fronts.

SUBTERRANEAN WATERWAY. This is one of the unique features of the ancient city, and its construction was an undertaking of no little

magnitude. The stream in the dry season is hardly more than a playful, sparkling brook, but in the wet season it must become a formidable torrent, a fact well attested by the numerous channels over which it spreads during the torrential period when the waters fail to find their way into the aqueduct at the upper end. A motive for the building of this tunnel is found in the fact that the stream must have been destructive to the terraces on which the buildings stand and to such other constructions as happened to be located near its banks. Perhaps an equally satisfactory motive may be found in the circumstance that during periods of high water free communication between the Palace and the various temples to the east—probably a matter of great consequence—would have been seriously interfered with. The upper end is now clogged and entirely hidden by stones, but the indications are that the opening was a little below the Temple of the Beau Relief. At this point the stream disappears gradually through its bed and issues again from the lower end of the arched way at a point almost even with the north end of the Palace (see panorama) and about 100 feet to the east of it. Below this it rattles down its steep, rocky bed, passing for a hundred feet or more between remnants of cyclopean appearing walls. The archway, a section of which appears in Fig. 65, is, as it stands to-day, some 500 or 600 feet in length. Throughout all this distance the stream was formerly hidden from view, and is now hidden in the dry season.

There has been some discussion as to the course of this arched way, and I entered it from below to make observations. Compass bearings were taken to a point where light streamed in from above, and by duplicating these observations on the surface the opening was located opposite the middle of the east base of the Palace pyramid and only 10 or 15 feet away (T, Fig. 49). The surface torrents have here torn a ragged hole in the ground to a depth of 4 or 5 feet, exposing the heavy slabs that cover the archway and displacing two or three in such a way that an opening is made nearly large enough for a man to enter, and below, at a depth of some 6 feet, the rushing waters can be seen. If the direction continues as at this opening for 20 or 30 feet, the vault passes under the margin of the terrace, and possibly, farther on, it may pass beneath the corner of the Palace. It is not wholly improbable that a passageway may some day be found descending from the interior of one of the southern buildings to the water. I regard it as likely, however, that the arched way was built to get rid of the torrential action of the stream rather than to secure a secret means of water supply. The course of the channel is indicated approximately on the accompanying map and in Fig. 49.

The arch is well built of irregular stones, often of large size, and is founded on the solid but uneven limestone surface. The walls are fairly even; the arch is of the usual type, and at intervals of 30 or 40 feet stone beams are set across, as shown in the section. The height at the lower end is about 10 feet and the width 7 feet, while the depth of the roof from the surface of the ground is from 4 feet to 6 or more.

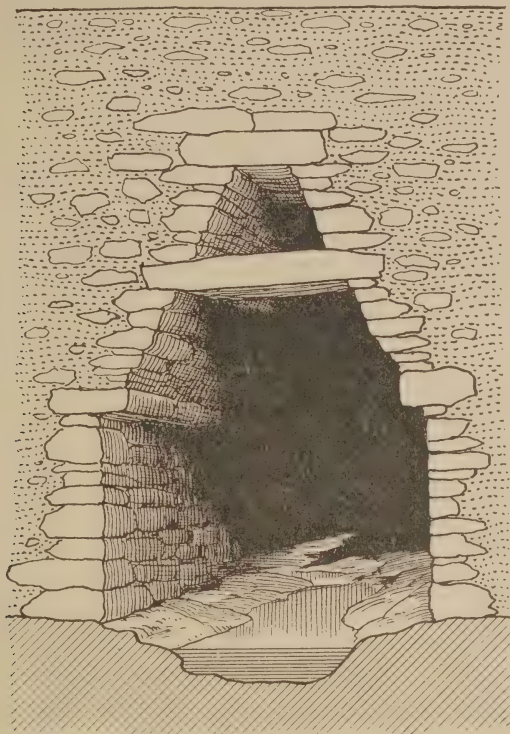


FIG. 65. SECTION OF WATERWAY ARCH. HEIGHT 10 FEET.

THE BRIDGE. The existence of a bridge over the Otolum has been noticed by several authors. It is located some 700 feet below the Palace pyramid and is upwards of 30 feet wide and about 40 feet long. The construction is apparently the same as in the long waterway, and indeed the latter may be regarded simply as a wide bridge, the upper end of which has been choked up by debris. The published illustration of the arch employed in the lower bridge (Bancroft, Vol. IV, p. 343) conveys a wrong impression of its character, representing as it does only the upper part of the vault, the lower part having been obscured by a pool of water backed up from a dam of calcareous tufa.

The full arch would, without doubt, almost exactly duplicate that of the long tunnel (Fig. 65), as well as that of the buildings of Palenque. The stones are better cut and laid in this arch than in that of the waterway above because they represent the original facing of the structure, whereas in the other case the opening, probably originally faced in like manner, has been destroyed by floods. In the illustration, Fig. 66 (upper part from Bancroft, lower part restored), the curve or sag of the soffit lines has been so exaggerated as to suggest a new type of structure.

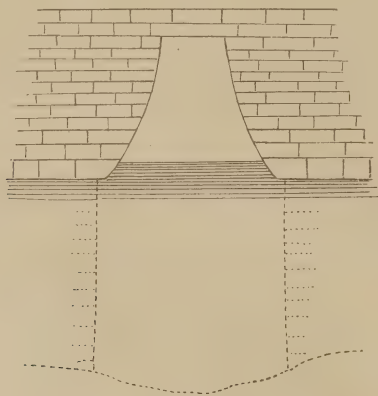


FIG. 66. BRIDGE ARCH INDICATING PROBABLE CHARACTER OF SUBMERGED PORTION.

TOMBS. The evidence is sufficiently strong that the pyramids and buildings of Palenque were devoted in some measure to mortuary uses, and this, too, by the original builders. Such use would appear, however, to be secondary if, as we are in the habit of assuming, the temples were the sanctuaries of deities, about and in which the various rites and ceremonies of worship were carried on. Yet the discovery by Del Rio of evidences of a burial beneath the sanctuary floor of the Temple of the Cross and of similar evidences by Waldeck in a gallery in what he calls the Temple of the Palace, suggests the possibility that the whole structure in such cases may have been erected to do honor to some ruler or religious official whose remains occupied a vault in the body of the pyramid or were consigned to the spot over which the inner sanctuary was erected. It was customary, evidently to build small tombs in the sides of the pyramids as it was also in Yucatan on the north and Oaxaca in the west. Speculations as to the relation of these mortuary uses to the main, original function of the structure are, however, of little avail, and I will only pause to refer to the results of our excavations in the pyramid of the Temple of the Cross. The position of what was believed to be a



ARTICLES FROM A TOMB IN THE SIDE OF THE PYRAMID OF THE TEMPLE OF THE CROSS.
LENGTH OF FIGURE 7 INCHES.

tomb was pointed out by Mr. Herman Collier of Santo Domingo del Palenque, and Mr. Thompson spent the best part of two days clearing out the small, much disturbed chamber, finding traces of burials, and recovering a very interesting set of votive objects and articles of personal ornament, illustrated in part in Pl. XXIII. Mr. Thompson's notes on his work are as follows:

"South 60 degrees west of the façade and about two-thirds down the western slope of the pyramid are traces of a number of tombs. The changes of time and the elements have left these tombs buried beneath the general debris but yet quite near the surface; so near in fact that the mere clearing away of the superincumbent vegetable mold reveals the broken stone slabs that once formed part of the chamber walls or roof.

"The row of tombs examined seems to have been placed parallel with the line of the façade of the temple, and my idea is that when the mound is explored in a thorough manner it will be found that there were several tiers of tombs and that they existed on more than one side of the mound. I got this idea as I waded through the vegetable mold, by seeing the familiar fragments of burial cases (stone slabs) on other sides of the pyramid and also above the tier of tombs encountered.

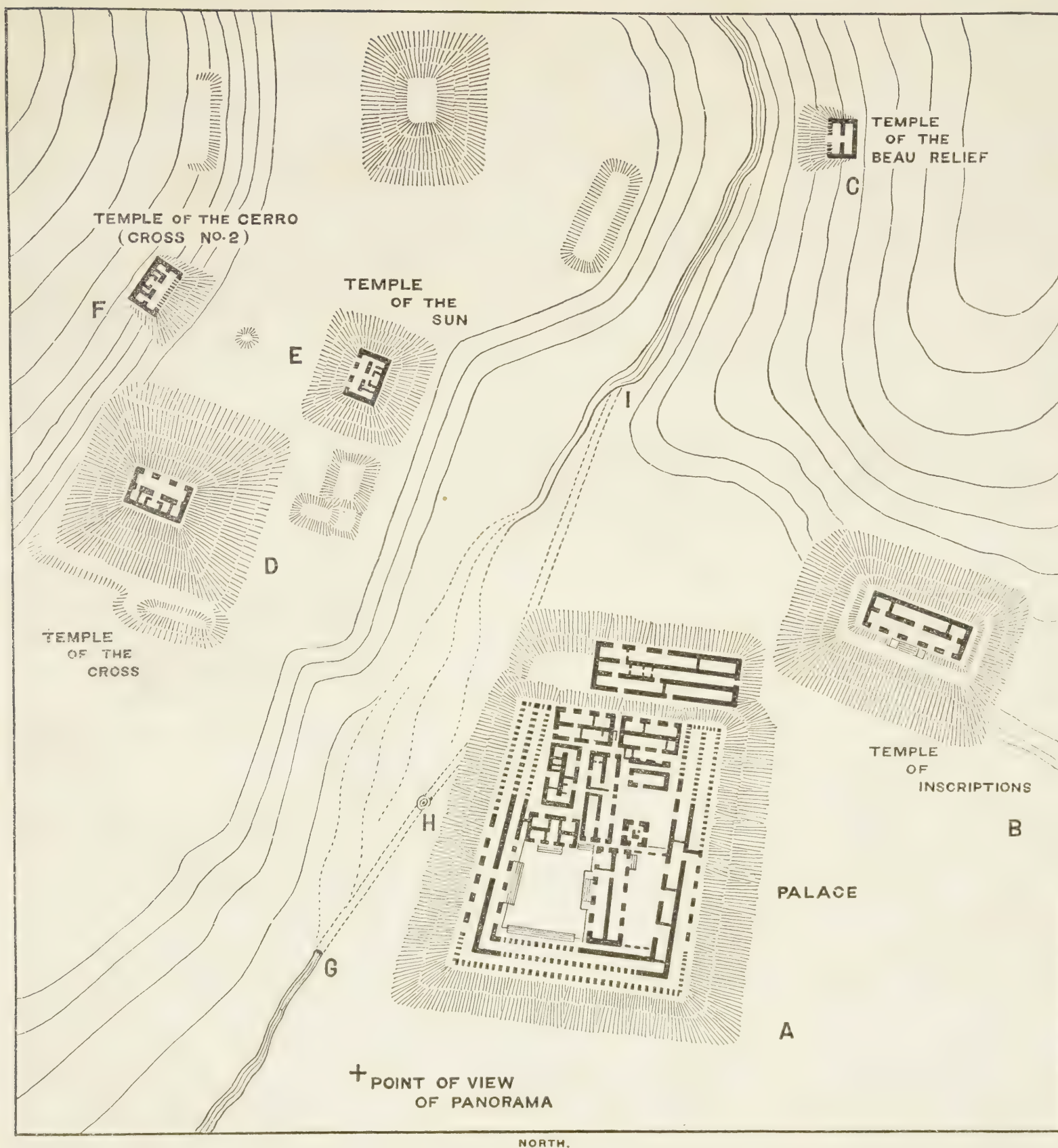
"The tomb examined was built into the side of the pyramid and formed a rectangular room 6 feet 8 inches long by 6 feet wide and 7 feet high. It was well built of lime material and stones and had the appearance of having been once smooth-finished with white stucco. Of this stucco hardly a vestige now remains in place, but the floor of the tomb was covered with its finely comminuted fragments. The roof was vaulted with that form of the corbel vault known as the Maya arch. In the center of the tomb was a rectangular, stone burial-case, 5 feet long, 2 feet wide and $1\frac{1}{2}$ feet high, each side of which was formed of two smooth-finished stone slabs, each 2 inches thick. The inner slabs were sunken below the edges of the outer sufficiently to allow the slab that served as a cover to be let down flush with the edges, thus forming a complete though simple depository for the dead.

"The top of the burial-case was covered with debris that time and dampness had hardened into a compact mass. Carefully clearing off this adherent material I found upon the exposed surface the votive offerings of the ancient mourners, consisting of a small broken terra-cotta effigy and various articles of personal use. As indicated by the position of the fragments, the terra-cottas had been broken purposely before being placed within the tomb, an ancient custom that prevailed to some extent also in Yucatan.

“Lifting the heavy top I found the remains of two skeletons, but so utterly decomposed that a touch destroyed them. One was lying upon its side with arms and knees drawn up toward the chin. The other was so nearly obliterated by the action of water entering through joints opened in the case by some disturbance of the pyramid base, that its exact position could not be ascertained.”

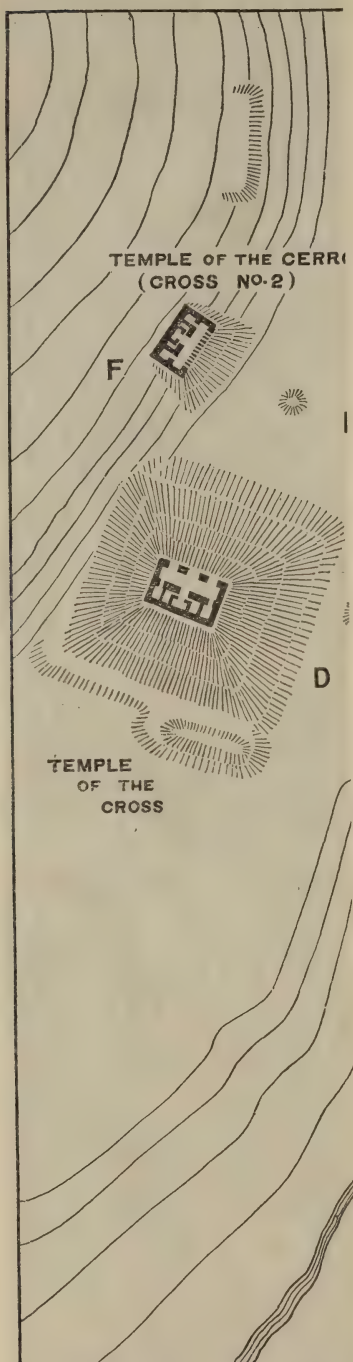
The principal object recovered is a little terra-cotta figuré, the arms and feet of which have disappeared. It is strongly modeled in yellowish clay, the surface of the front having received a coat of red paint. The style of work is decidedly characteristic of Palenque; the skull is represented as flattened to an extraordinary degree, and the upper part of the nose and the space between the brows is elevated into a vertical ridge which possibly represents an attached ornament such as is seen in some of the mural reliefs and in the limestone tablets. There is a picturesque head-dress composed apparently of flowing feathers, a necklace of beads and large ear-disks; on the surfaces of the latter are distinctly seen imprints of the finger tips of the potter. The body is decked in a loin cloth looped at the left side and falling in front in the usual manner. Along with the figure were a number of greenstone beads—probably of jadeite, and a spindle whorl, or bead, of ornamental design and excellent finish, in the same material. In addition there were lance heads, a large, rudely finished bone bead, a small and exceptionally perfect obsidian flake knife and some bits of well shaped and neatly finished earthen cups.

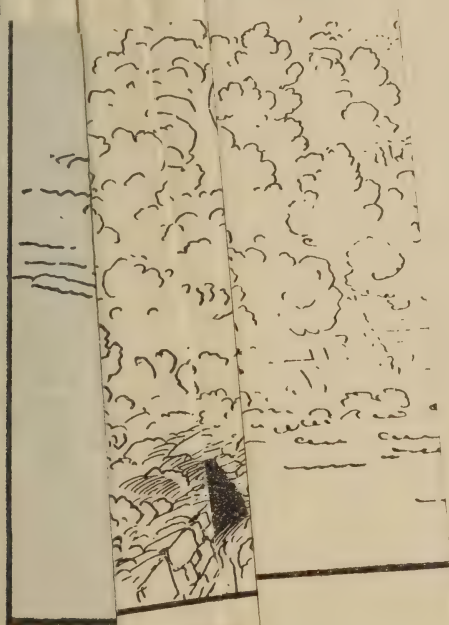
CALCAREOUS DEPOSITS. I have already referred to the remarkable calcareous deposits in the Palenque buildings and in the channel of the Otolum. The climate is wet, and during the long rainy season water is constantly penetrating the massive limestone masonry of the buildings, dissolving the lime and depositing it in sheets over the walls and in patches and conical masses on the floors. The wall surfaces, the ornaments, and for that matter the walls themselves, have thus been preserved much more completely than would otherwise have been the case; but the most remarkable phenomena of this class are the deposits in the channel of the creek below the ruins. For quite a distance, as we descend the steep trails from Palenque, the sound of cascades is heard filling the forest with plaintive music. The waters of the stream, flowing down through the forests, become charged with vegetable acids and dissolve the limestones over which they pass. The calcareous matter thus taken up is deposited again farther down, where extended cascades furnish the conditions necessary to precipitation. Innumerable pools are formed, the margins of which are built up little by little until the water turns to one side, building



SKETCH MAP OF PALENQUE.

SCALE ABOUT 100 FT. TO THE INCH.





A. Temple of the ss.



A. Palace.

B. Temple of the Inscriptions.

C. Temple of the Bas-Relief.

D. Temple of the Cross.

E. Temple of the Sun.

F. Temple of the Cerro.

G. Opening of Waterway.

H. Washed Opening into Waterway.

I. Upper End of Waterway.

PANORAMIC VIEW OF PALENQUE.
LOOKING SOUTH.

other basins which are deserted in turn, and the wide channel thus becomes a succession of terraces, often very attractive in appearance. So abundant is the calcareous matter held in solution that everything touched is coated. The trees are overwhelmed and die; the stones in the stream beds grow into round masses and join one to another in solid bodies; nuts and shells and all hard objects are encased and become the nuclei of rounded stones. I picked up numerous roundish pebbles and globular masses and on my return, suspecting their true character, had them sawed in two to find at the center (Fig. 67) generally a land shell of the *Bulimus* family which is very plentiful in these forests.

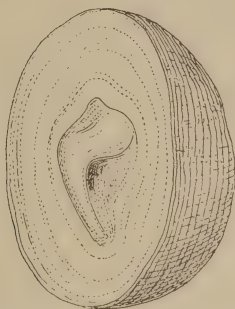


FIG. 67. SECTION OF CALCAREOUS NODULE CONTAINING BULIMUS SHELL.

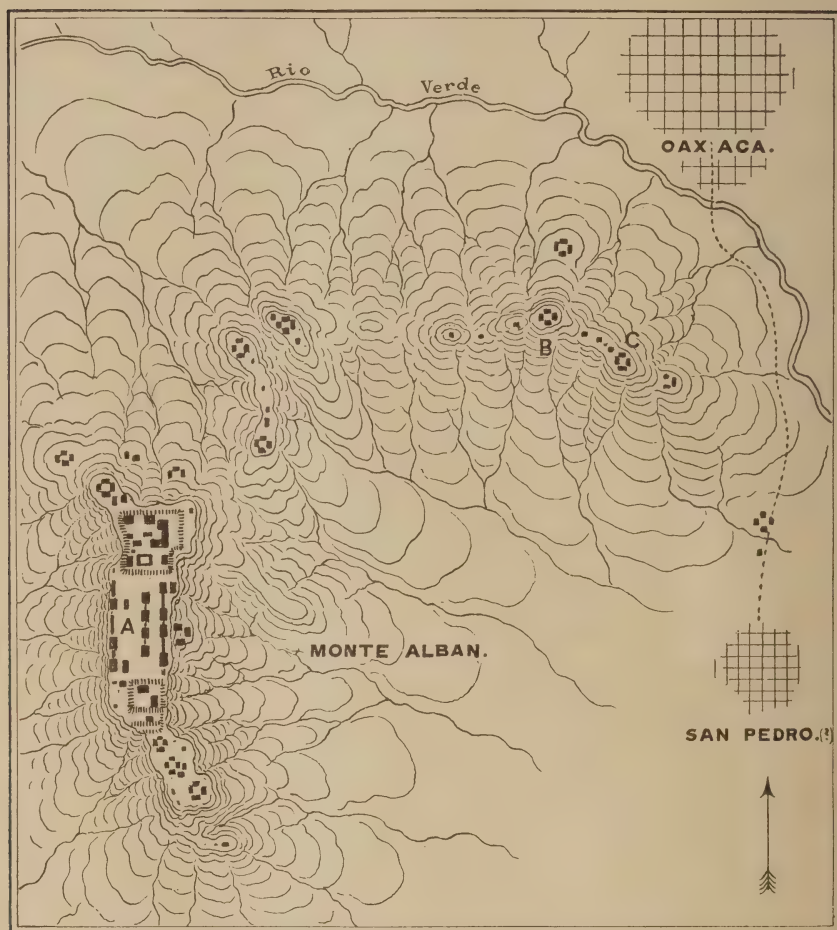


FIG. 68. SKETCH MAP OF MONTE ALBAN AND VICINITY.

Scale about 1 mile to an inch.

- A. Great plaza occupying middle portion of the main summit of Monte Alban; north and south of this are the two pyramid-crowned terraces (see Pl. XXVI).
- B. Crest of the Lesser Alban. The summit quadrangle appears in Fig. 68.
- C. Outer quadrangle of the lesser ridge from which the panorama, Pl. XXVI, was made.

RUINS OF OAXACA.

INTRODUCTORY. Until very recent years the State of Oaxaca remained much isolated from the world at large, but the building of the Mexican Southern Railway has changed all this, and now the section is frequently visited by students who find a fresh and fascinating field for investigation. The principal occupants of the Oaxacan region in ancient times were known as Zapotecs and Miztecs, and the population to-day is made up largely of their descendants, who have in a shiftless, squalid way adopted more or less fully the habits of life and arts of the whites. The native culture of these peoples is thought to have been influenced somewhat decidedly by that of the Nahuatl race to the north; but in many respects their art is strongly individualized, and the building arts, metal work and ceramics, on which the archeologist must chiefly rely, are remarkable for the originality of many of their features. It is also to be noted that within Oaxaca there are very decided differences in the art remains of the different sections, thus bespeaking a localization of cultures and peoples, due in some measure no doubt to the pronounced and varied physical characters of a country abounding in great valleys separated by lofty ridges and almost impassable mountain ranges.

The city of Oaxaca, which has a population of some 30,000 souls, is 150 miles south of Vera Cruz and 30 or 40 miles south of the continental divide. It occupies the mountain bordered valley in which the Rio Verde takes its rise. This stream, after passing Oaxaca, flows 50 miles south, 50 west, and then 40 or 50 miles south again into the Pacific Ocean.

About Oaxaca many of the important architectural remains are found on the mountain tops, and one soon comes to recognize the notched profiles of the ridges and peaks that border the valley as being due to the strangely directed enterprise of the ancient inhabitants. The feeling of surprise induced by this discovery is followed by one of amazement as the real nature and extent of the work dawns upon the mind. As the explorer climbs the slopes and picks his way from summit to summit, he is fairly dazed by the vast array of pyramids and terraces, which not only crown the heights but overspread

the steep slopes, destroying traces of natural contour and making the mountains actual works of art.* From the massive ramparts of these mountain cities one gazes down into the blue and distant valleys, where the present cities and towns appear as mere patches of white and pink set in fringes of green. My hurriedly made panoramic sketches will aid these brief descriptions in conveying a definite notion of the country and the ruins.

Aside from these highland cities there were doubtless many lowland towns belonging to the same period, but cultivation and modern building have greatly accelerated their destruction. There are numerous mounds in the valley about Oaxaca which, though much reduced in height and changed from the original form, show the same general characters and arrangement as do the mountain remains.

RUINS OF THE LESSER ALBAN.

From the roof of my hotel in Oaxaca, with Volume IV of Bancroft's great work in my hands, I scanned the surrounding highlands with the hope of identifying Monte Alban, the fortified mountain said to lie to the westward of the city from half a mile to five miles away according to the estimate of various explorers. There rose to the south and beyond the river the hazy face of a mountainous ridge with uneven profile, that would answer the descriptions given sufficiently well, but there were no signs by which it could be identified as Monte Alban—the white mountain. There were other ranges to the right and left, and just behind the front ridge appeared the summits of a lofty profile that seemed to be many miles away. I noted the front ridge which rises from the bank of the river just south of the town and a mile or more away, first in a gentle slope to a slight shoulder on which were mound-like humps, and then again by a steeper incline to the main crest. Beyond this with various risings and fallings it extends off toward the west, apparently connecting with the highland behind. The face toward the city is very steep and uniform, broken only by inferior, rib-like ridges and shallow gullies which extend from the crest to the base. The slopes are for the most part bare and altogether parched, being diversified only by occasional patches of scrubby trees clinging to the more rugged portions of the surface. I resolved to climb this ridge and take a survey of the region. Its crest is at B, on the accompanying map, Fig. 68.

*The recent discoveries of Mr. Wm. Nevin in the adjoining state of Guerrero, directly west of Monte Alban, indicate the continuance or repetition of remains of the peculiar character here described. Many square miles of the crests and slopes of the mountains are buried in the ruins of dwellings and temples.

It was late in the afternoon when I crossed the river, picking my way along the crowded highway where I was tempted to tarry among the picturesque horde of native men, women and children, on their way to market, some on foot, others astride donkeys with great paniers filled with no end of farm produce and marketable wares; and others in wonderful carts with strangely yoked steers and marvelous loads—the whole affording more picturesque subjects for camera and painter's brush than I had ever seen.

Crossing the river, now carrying but little water, I reached the east end of the mountain ridge half-a-mile beyond, and turning to the right out of the road began the ascent. At an elevation of some 300 feet the first break in the profile was reached—an abrupt shoulder, nearly level for a few hundred feet though quite narrow. Here there are numerous traces of ancient occupation, and a group of low mounds occupies the outer point. The principal mound, some 60 feet long and 25 feet wide, stands on the outer margin. Its outer slopes are long, connecting with the mountain incline below, while on the inner side it is not more than 10 feet high. It has undoubtedly been the substructure of a building, and the margins of a cement floor outcrop from the sides near the crest. Standing on this pile and facing the mountain, we observe a depressed space a hundred feet square bordered by a second mound on the north and low ridges on the south and west; next this is a flattish space, some 80 or 90 feet wide, and beyond still a succession of low, narrow terraces terminating against the rocky rise that leads to the summit. It is clear that the four outer mounds are the remnants of structures arranged about a court forming a quadrangle, but every part, save the two principal piles, has long been under cultivation, and it is hard to say just what part of the terracing, everywhere visible about the mounds and extending down the slopes and occupying every available bit of space around the precipitous faces of the mountain, is of the ancient time; but that the work is in the main prehistoric is fully shown by the almost universal presence of broken earthenware, the gray, elaborately modeled figure vases so characteristic of Zapotec culture prevailing to a large extent.

Leaving the shoulder and its dessicated garden beds, I passed up the rocky incline some 400 feet to the summit, which I found surrounded by terraces and crowned by ruins. A well preserved quadrangle occupies the outer point (in the foreground of the panorama, Pl. XXVI), and from the outer pyramid a superb view is obtained of the valley and its cities and towns spread out below. The superstructures are entirely removed from the oblong mounds, which appear to have been from 12 to 20 feet in height, 60 or 70 feet long, and

20 or 30 feet wide—summit measurement—and inclose a depressed area fully 100 feet square. The mounds are well rounded and much broken down; and in places where the hearting is exposed it is seen to consist of stones and earth somewhat irregularly thrown together. At the surface some system was observed in laying up the stones, and traces of cement floors are seen about the summits. From the outer mound several terraces extend down the slope, but the sides of the ridge are steep and rocky.

Turning to the west we look along the ridge and observe its somewhat sinuous and uneven crest (see panorama), and find that every part is occupied by ruins and terraces, the rounded mounds arranged in quadrangles crowning all the prominences. The crest is narrow, rarely exceeding 100 feet in width, and its level spaces are shaped into a series of rude terraces which rise and fall with the profile; all of these are now under cultivation, the industrious natives scratching up every available square rod of the rocky soil to plant their corn. A slight spur of the ridge extends out toward the city and terminates a few hundred feet below in a shoulder like that encountered at the east end; this is occupied by remnants of buildings in the usual quadrangular arrangement.

The appearance of this ruin-covered ridge, as seen from the outer mound, is shown in the accompanying panorama, Pl. XXVI. The crest extends a mile away to the west, connecting by a low saddle with a great mountain crest beyond. This latter mountain, at the nearest point nearly two miles away, was readily recognized as the true Monte Alban, and I was much impressed with its grandeur, the effect of height being greatly enhanced by the hazy condition of the atmosphere. The summit appeared strangely serrated, but at first it did not occur to me that these irregularities were due to the system of artificial structures with which it is crowned.

In making the sketch for the panorama I assumed a point of view that would bring the quadrangle of the east end of the near crest—the Lesser Alban as it is called for convenience—in the foreground. The river appears at the base of the slope at the right and on its farther bank are the upper suburbs of the city, while beyond are the lofty summits of the continental divide; and extending to the northwest is the valley along which the railway descends to the city.

Following the crest toward the west, traces of several structures were encountered, and on the first high summit, some 2,000 feet from the outer end, stands the best preserved ruin of the series (G). It consists of the remains of four structures occupying the entire crest, and inclosing a court in the center of which is a pile of debris mark-

ing the site of a shrine. The lateral pair are mere ridges representing oblong structures that once overlooked the steep mountain sides; while the crosswise pair are quite bold in outline, the summits measuring some 60 feet in length and 20 feet in width. These mounds (Fig. 69) have been dug into by explorers or treasure hunters and are of the usual composition, with traces of cement floors at several levels. Though occupying these irregular mountain crests the buildings have as a rule been oriented with much care.

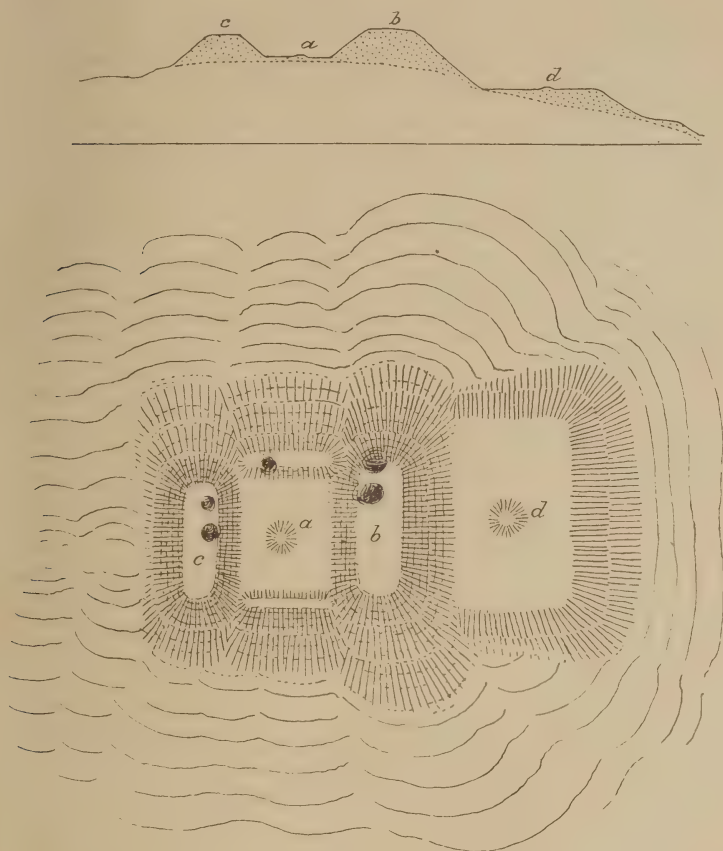


FIG. 69. CREST QUADRANGLE OF THE LESSER ALBAN.

- a.* Court with traces of central shrine (?).
- b.* Eastern mound or pyramid with excavation pits.
- c.* Western mound.
- d.* Terrace with central knoll.

Extending out from the base of the eastern mound is a terrace nearly a hundred feet square, in the middle of which is a small conical mound. The mountain slopes are very steep at the sides, as

indicated in the panorama. Westward of this group there are but slight traces of ancient buildings. There is one deep saddle affording a wide flattish space which has a few low mounds. This spot has evidently been extensively occupied for dwelling, as the soil is filled with stone implements and remnants of earthen vases; there are also rubbing stones, mortars, hammer-stones and flints. Beyond the saddle is a single summit of conical form, the crest of which is truncated and bears traces of buildings and dwelling. From this point there is a descent of several hundred feet to the pass that partially separates the lesser ridge from an outstanding northeastern spur of Monte Alban—as shown somewhat plainly in the panorama. From the conical summit I returned again along the ridge and reached the city at night-fall.

The eastern end of the ridge exhibits outcroppings of a gnarled limestone which may be of silurian age, but the middle and western parts are composed mainly of quartzites passing apparently into gneisses. The strata seem to dip toward the north at a high angle. The only example of dressed stone seen on this ridge was a mass of limestone, near the east end, which had been leveled off and smoothed near the ground, giving a table-like surface some 5 feet in diameter.

RUINS OF MONTE ALBAN.

The visit to Monte Alban was the most romantic feature of my trip to southern Mexico. Having secured a horse I crossed the river and, passing beyond the end of the ridge already described, soon reached a village called San Pablo; from this point I turned to the right and shaped my course up the gentle slopes toward the middle of Monte Alban which rose as a great wall to the west (see panorama, Pl. XXVI). Turning to the left when near the base of the steeper slopes, I climbed the extreme southern spur of the mountain which is about five miles from the alameda in Oaxaca. I passed up over alternating narrow cultivated terraces and outcropping ledges of limestone; the latter, interbedded with quartzites, form the body of the mountain and dip slightly to the north, the outcrops along the steep sides giving the mountain a peculiar, ribbed effect. On this outer point, seen at the extreme left in the panorama, I began to encounter small mounds, which represent ancient buildings, beside many indications of dwelling. On the second level, 300 or 400 feet higher and but little below the main summit, the first well-preserved quadrangular ruin-group was encountered. It is seen on the sketch map at

H, and consists of four oblong mounds arranged about a court, in the center of which is the usual small conical pile of debris. The northern, southern and western sides are represented by low, rounded ridges of debris, the north ridge being about 8 feet high. The eastern structure is a pyramid, nearly 25 feet high and with steep sides. The main level of the summit is about 40 feet square, and is occupied by a heap of debris representing a superstructure—a house or temple—set back toward the east side. The cement floor is visible at the edges, and traces of stone walls are seen all around. The remnants of what appears to have been a stairway occur on the sides next the court, which is about 100 feet square. This ruin is on a wide cultivated terrace, supported by a succession of inferior terraces encircling the promontory on three sides. Small mound-like remnants of buildings are seen on all hands. Passing over the cornfield to the northwest I reached, at a distance of 500 feet, a second group of mounds that includes one typical quadrangle. The court of the quadrangle is some 80 or 90 feet square, and has the usual low mound in the center. The south member is 20 feet high by 45 feet long and 40 feet wide, and has the ruin of a superstructure—a mere heap of stones—on its summit. The other sides are from 5 to 10 feet high and are rounded ridges representing ruined houses. At the southeast corner of the quadrangle, rises a mound showing considerable loose stone all over its sides. It is a few feet higher than the south member of the quadrangle, which it approximates closely in horizontal dimensions. At the north base is a deep depression separating the east ridge of the quadrangle from a lower ridge at that end. Rising from this at the north there is a terrace about 80 feet square supporting the much reduced remains of a building. The mountain ridge, here quite narrow, falls off rapidly in terraces on both sides. Following the ridge to the north some 300 feet, still over a narrowing field, another quadrangle of usual plan and proportions was observed. The buildings are represented by ridges of stone and earth, which are at no point over 10 feet high.

One hundred feet farther on I ascended the face of a terrace, upwards of 40 feet high, which crosses the ridge at right angles, the left margin following the oblique trend of the mountain side, and the right descending to a marginal terrace which continues north for a long distance on the east side. Crossing this terrace and some low mounds I ascended a second terrace 10 feet high and came in view of the southern member of the great central group of remains. The latter is a pyramid more than 400 feet square and 40 or 45 feet high, supporting two pyramids on its summit. The slopes of this great mass are pre-

cupitous all around and covered with trees and the debris of fallen walls. I climbed the south face by a steep pathway, leading my horse up with much difficulty. From the main level I ascended the central pyramid, which is the crowning feature of this part of the crest, and obtained a magnificent panorama of the mountain and the surrounding valleys and ranges. Turning to the north the view along the crest was bewildering in the extreme. In years of travel and mountain work I had met with many great surprises—such as that experienced on emerging suddenly from the forest-covered plateaus of Arizona into a full view of the Grand Cañon of the Colorado, or of obtaining unexpected glimpses of startling Alpine panoramas—but nothing had ever impressed me so deeply as this. The crest of Alban, one-fourth of a mile wide and extending nearly a mile to the north, lay spread out at my feet. The surface was not covered with scattered and obscure piles of ruins as I had expected, but the whole mountain had been remodeled by the hand of man until not a trace of natural contour remained. There was a vast system of level courts inclosed by successive terraces and bordered by pyramids upon pyramids. Even the sides of the mountain descended in a succession of terraces, and the whole crest, separated by the hazy atmosphere from the dimly seen valleys more than a thousand feet below, and isolated completely from the blue range beyond, seemed suspended in mid air. All was pervaded by a spirit of mystery, solitude and utter desolation not relieved by a sound of life or a single touch of local color. It seemed indeed a phantom city, and separated as it is by half a dozen centuries from the modern city—barely traceable as a fleck of white in the deep valley beyond the saddle of the Lesser Alban—furnishes a tempting field for speculation.

I have endeavored to convey some notion of this remarkable scene in the panorama (Pl. XXVII) which is constructed from a sketch made from the summit of the central pyramid seen in the foreground of the view. The point of view assumed is indicated by a cross in the profile view of the mountain (Pl. XXVI), and also by a cross on the accompanying map (Pl. XXVIII). In the foreground is the great terrace, referred to above, crowned by its two pyramids, one placed at the southeast corner and the other, the main mound, situated a little to the left of the center.

Behind this group is the central feature of the ancient city, a vast court or plaza, a level, sunken field 600 feet wide and 1,000 feet long, inclosed by terraces and pyramids and having a line of four pyramids ranged along its center. The great lines

of mounds at the right and left border the abrupt margins of the mountain, and beyond is the most astonishing feature of all—a broad terrace 600 or more feet square, within which is a sunken court surrounded by numerous pyramids that rise in a culminating group at the distant right. Beyond this at the left are other groups of mounds, and still other groups occupy the spurs and subordinate crests into which the north end of the mountain is broken. At the left and farther away are two independent, rounded, mountain crests crowned by groups of mounds. At the right is the extreme west end of the Lesser Alban, and beyond and far below are caught glimpses of the valley with its villages and farms; and rising beyond this are the lofty ranges of the continental divide, so obscured by the haze of the dry season that their serrate profiles can hardly be made out.

It was three o'clock in the afternoon when I finished the sketch, and when night came on I was in the midst of the great group at the north end, having climbed in the meantime eighteen of the forty or fifty pyramids included in the view, and having made the accompanying sketch map and various drawings both general and detailed. During the day I encountered but one man, who came up over one of the terraces, shook hands and passed on, but managed while my back was turned to skillfully extract a valuable pistol from my saddle. I may add that my horse was of little service, and hindered rather than aided me, so that most of the work was accomplished on foot. Owing to the necessary haste I cannot claim for my drawings and descriptions more than approximate accuracy, though it will be found, I am sure, that they give correct general impressions. In drawing the panorama the mantle of foliage enveloping many of the forms has been largely ignored, and the outlines are given somewhat more firmly than they appear in the reality, yet there is no attempt at restoration.

The group of structures occupying the foreground in the panorama forms the southern member of the great, composite quadrangle of Monte Alban. The substructure is a low truncated, pyramid upwards of 400 feet square at the base, with regular though now slightly broken slopes rising at a steep angle to a height of 40 feet or more. The summit is quite level and approximates 300 feet square.

The pyramid occupying the southeast corner is 80 feet square at the base and perhaps 60 feet square on the summit. The height is about 25 feet, and the outer slopes are nearly continuous with the slopes of the substructure. The presence of piles of debris covering the crest and sides makes it apparent that the building was faced with stone—not dressed, however, as this quartzite is too hard to be cut readily with stone tools.

This pyramid has been extensively tunneled by explorers and treasure hunters; passages have been opened entirely through the base of the pile both from east to west and from north to south, and a great well descends from the center of the summit to the intersection of the tunnels. The walls of these excavations are entirely uneven, presenting no indication of original openings or chambers, notwithstanding the impression given by Dupaix in various illustrations that the galleries pertained to the original construction and were well built and faced with stone. In the sides of the excavations beds and masses of loose stones—now coarse, now mixed with finer materials—alternate with beds and lenticular masses of adobe and cement-like deposits of light color, the latter occurring in cases in such thin and level layers as to suggest successive floor levels.

The central pyramid is not far from 100 feet square at the base, and is 25 or 30 feet high. The sides are steep and but little broken down, and the summit, which is covered by the debris of a building, is something like 50 by 60 feet in extent. This mound has been tunneled from north to south, and its composition is similar to that of the companion structure. The idea of the quadrangle seems to have been in the minds of the builders of these piles; the space to the east of this central mound and north of the corner mound is inclosed on the north by a line of debris, probably representing a building, and in the center is a small mound such as characterize nearly all the courts. A somewhat novel feature of this group is a low ridge of debris about 25 feet wide, and 10 feet high in places, extending along the northern margin of the main terrace. It is interrupted for a short space near the middle (the landing of the stairway perhaps) and is composed largely of stones, portions of a strong stone wall appearing in places.

Descending this massive structure at the northeast corner, I encountered near the base portions of the ancient facing; this consists of large blocks of stone, systematically laid up, on which are seen various bas-relief sculptures. The principal figure exposed to view is a serpent carved in low relief; the head, occupying a block 2 by 3 feet square, is crowned with an elaborate radiating crest, and a long coiled tongue extends from the mouth. The snout is somewhat porcine in character, being rounded and turned up slightly at the point. The style of delineation is entirely distinct from that characterizing representations of the Maya serpent. The rattles of the reptile's tail appear on a neighboring block. The stone—apparently a quartzite—was too difficult to carve to encourage elaboration. These stones have vertical faces, indicating that the pyramids, like those

of other sections, had a series of vertical steps offsetting to the summit. It was while I sketched the serpent's head that the old Indian robber secured my pistol.

At the base of this pile on the east is a terrace some 50 feet wide, which descends the side of the mountain 60 feet or more to be followed by others, and in such abrupt fashion that little can be seen of them from above. Across this first terrace, connecting with the corner of the pyramid, is a massive stone wall 10 feet high and with slightly sloping faces. At this point begins the irregular line of pyramids that connects along the east margin of the mountain serving to inclose the great square on this side. These pyramids are of irregular height and varying horizontal extent, but form a continuous chain, the larger mounds being connected by inferior structures, so that the great inclosure is not open to the mountain brink, save perhaps at the north end, where there is now a passage and a roadway or trail. It is to be noted that these mounds are in a single line, standing on the very brink, and that there was no attempt at assemblage in quadrangles save perhaps at the north end and in a group occupying a subordinate level on the east declivity. There are five principal pyramids in the chain, one near the south end 100 feet from the base of the great southern mound; two closely associated oblong pyramids near the middle of the line, the loftiest having a height of 35 or 40 feet and a length of at least 150 feet; and two others, not widely separated, next the north end. The connecting ridges, shown in the panorama and map, are from 10 to 20 feet in height and 40 or 50 feet in width, and, although somewhat irregular in form, bear evidence of former regularity. It is highly probable that all were neatly and symmetrically finished, and supported a series of imposing buildings. Many of the mounds show traces of mutilation by modern explorers.

The chain of pyramids extending from north to south along the middle of the great square constitutes one of the most interesting features of these remains. They are well shown in the panorama and map. In viewing these works one is tempted to indulge in speculations as to the conditions that must have prevailed during the period of occupation. How striking must have been the effects when these pyramids were all crowned with imposing temples, when the great, level plaza about them, 600 by 1,000 feet in extent, was brilliant with barbaric displays, and the inclosing ranges of terraces and pyramids were occupied by gathered throngs. Civilization has rarely conceived anything in the way of amphitheatric display more extensive and imposing than this.

In this central group there are four pyramids, the northern one standing alone and the others connected by subordinate links. The principal summits are about 23 feet in height, the bases approximate 100 feet square, and the level summits are less than 60 feet square. The third member is somewhat longer from north to south. All present considerable irregularities, due in some cases to debris of fallen structures and in others to modern excavation, and tunnels and pits appear in many places. The slopes are generally steep and covered with scrubby trees. In the south face of the southern mound, as indicated in the panorama, an ancient gallery or tomb-like cham-

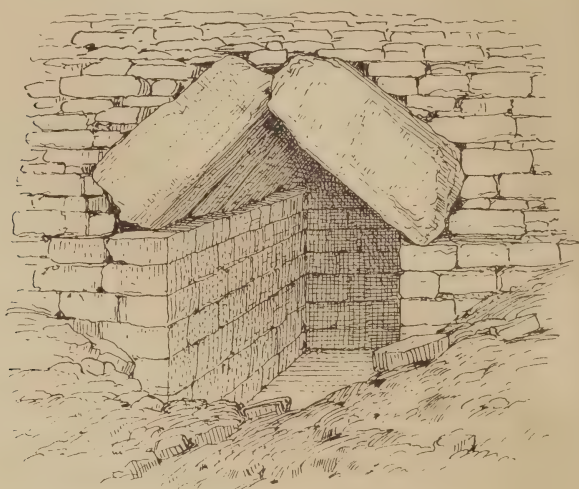


FIG. 70. CHAMBER IN SIDE OF PYRAMID; PROBABLY A TOMB.

The walls are well built of rough dressed stone and the ceiling is formed of massive blocks inclined together at the top. The situation is at *a* in the panorama. Width of chamber 3 feet; whole height about 6 feet.

ber is seen. It is at the left and a little more than half way up the slope. The opening is broken down, and the doorway, if any existed, is entirely removed. The chamber is about 12 feet in length; the lateral and end walls, faced with squarish blocks of slightly hewn stone, are 4 feet high; and the ceiling is formed of large unhewn or partially hewn blocks of stone resting on the lateral walls and leaned together at the top, as shown in the accompanying sketch, Fig. 70. The body of the pyramid, so far as exposed, is composed largely of stone and contains numerous stones of rather large size.

As shown in the panorama the chain of pyramids inclosing the great plaza on the west occupies a wide space and includes two or

three well-developed quadrangles. The various members have been connected pretty closely for the entire length.

The space, from 200 to 400 feet wide, lying between the base of the south-end pyramid and the mountain margin on the west side, is occupied by various works of inferior height, nearly all much reduced by cultivation. These features, as indicated on the map, are separated from the great western range of mounds by a slightly depressed space, 30 or 40 feet wide, which extends from the northwest corner of the south-end pile to the western brink of the mountain.

Rising from this depression on the north is a prominent quadrangular group, consisting of a great pyramid, on the outer side 25 feet high and 60 by 90 feet on the summit; an inferior pyramid on the inner side facing the great square; and two low ridges closing in the court on the north and south. The court is something like 100 feet square, and contains the usual central pile of debris.



FIG. 71. COLOSSAL HEADS IN LOW RELIEF.

The slabs project from the side of a pyramid, near the base, in the southwest corner of the grand plaza; *b* in the panorama. They represent the facing of the structure or the lining of a tomb. Height of heads, 15 inches.

North of the main western mound is a second large mound, 15 or 20 feet high on the inner side and 40 feet high on the west. The summit is much broken by depressions and piles of debris representing ancient structures, and is about 140 feet from north to south and 60 feet from east to west. Between these pyramids is a small mound much mutilated by modern excavation. Here I encountered the remains of another chamber, extending into the corner of the pile near the base, the walls of which are covered, at least along the upper margin, with crude relief sculptures. The roof is formed, as in the other case, of inclined stones of large size. This is probably the chamber in which Dupaix found human bones. Projecting a few inches above the debris I observed the sculptured stones described and illustrated by Dupaix. Figures of men in very low, crude relief occupy

the faces of the rather rough blocks, which are, I believe, of very hard limestone. The head most plainly seen (Fig. 71) is of colossal size, and belongs no doubt to the sitting figure copied by Kingsborough and Bancroft from Dupaix. In style the work is decidedly unlike anything that I have seen elsewhere.

The long mound is followed on the north by a low rounded pile, and this by a third pyramid of average dimensions; and beyond this again is the final member of the series—a low, wide mound much reduced by cultivation. All of these structures line up with the western wall of the mountain, and their outer faces are continuous with a great terrace whose steep face connects with still other artificial steps descending to the precipitous, ribbed mountain wall. The third pyramid forms the outer member of a quadrangle, the east member of which is a low, oblong pile facing the great plaza, while the sides have only obscure ridges.

Ascending the broad terrace front that rises to the north of the great plaza I encountered the most remarkable evidences of the enterprise and taste of the ancient occupants of Monte Alban. The entire mountain summit, varying from 500 to 800 feet in width, is occupied by a vast group of works. The east and west outlines follow approximately the somewhat uneven sides of the crest, and on the north and south the fronts extend in slightly broken lines entirely across from brink to brink. The distance from north to south is some 700 or 800 feet. The outline is approximately indicated on the map which, with the aid of the panorama, will give a fair idea of the varied and interesting character of the structures. Just how much of this great mass is natural and how much is artificial no one can state, but that the entire surface is artificial is apparent, and not only that, but the various sub-terraces, descending from its east and west sides for some distance down the mountain slopes, are also artificial. The several superposed pyramids first catch the eye, but advancing a hundred feet from the southern margin of the terrace a wholly unique feature is encountered; it is a sunken square 100 feet or more in extent and some 20 feet deep, on the level floor of which is a large pile of tree-covered debris, marking a central feature—a shrine or temple. Surrounding the depressed area numerous pyramids rise, some in one and others in two levels. The level spaces—even the bed of the sunken square and the summits of the pyramids—are under cultivation (in the wet season), and the arrangement of depressions and reliefs and the grouping of plain and tree-covered areas, strongly suggest a masterly piece of landscape gardening. At the west end of

the sunken area stands a pyramid of average dimensions, occupying the entire width of the terrace on that side; from this a view is obtained of the west face of the whole cluster of works as well as of the deep, precipitous gorge which descends the west face of the mountain from the sub-terrace bordering the main terrace on that side. The sides of this gorge are unterraced save in part, as they were too rugged and rocky to be successfully treated. It is the head of this gorge that breaks the continuity of the lateral terracing on this side of the crest.

On the east side of the sunken court we encounter first (at the right in the panorama) a pyramid of average size, resting on the margin of the main terrace and affording a view down over the complex system of subordinate terraces on the east side; and back of this a pyramid of compound form—a broad foundation mass supporting two superstructures reaching a height of 70 or 80 feet above the general summit level. The sides are all steep and the summits flat as usual, but all are so covered with vegetation that it is difficult to secure a clear view. Back of these and bordering the sunken court on the north are several mounds and depressed areas; and a single mound stands alone at the extreme northwest corner, from which views are obtained down the slopes and into the several drainage courses that separate the spurs of the northern end of the mountain. There has been much recent excavation in this great cluster of pyramids, and the center of the group, especially north of the sunken court, has been extensively dug over. A very interesting feature of the group is seen at the northeast corner, where there is an extension of the main terrace 100 feet or more in width and 400 or 500 feet from north to south; and at the base of this again, 30 feet lower, is a second level nearly 100 feet wide, extending all along the east side and connecting in a somewhat broken line along the north side. From these terraces we look down upon many subordinate terraces and mounds, and the eye follows the main northeast spur until it connects by a saddle with a prolonged subordinate summit extending far out toward the Lesser Alban, and from which it is separated by a low pass. This great spur is crowned with an extensive system of terraces and mounds, repeating in a measure the phenomena of the principal summit; it is not included in the large scale map, but is seen on the smaller map (Fig. 68) and at the right in the panorama.

From the northwest angle of the great group described above, a broad spur of the mountain extends outward, dividing up into subordinate ridges as it descends, and on every available spot mound groups, mostly in quadrangular arrangement, are seen; the first and

second clusters of these are seen in the distance at the left in the panorama, and these also come within the limits of the map. The first group consists of two somewhat irregular mounds below medium size, and the second is a quadrangle with the usual court and central pile. The mounds are small. This was the extreme point visited in this direction.

I need add to this hasty sketch only a few brief remarks in résumé. In ancient times the Monte Alban district was no doubt densely populated, and this mountain was a favorite seat—not a fortress simply, or even a sacred place devoted exclusively to worship and burial, but an actual city, the center of population of an agricultural people which utilized the valleys, and terraced and planted every square yard of available ground up to the very crests of the mountains. The city in the sky was probably occupied not only in the wet season, when rain would supply the water needed for subsistence and agriculture, but means must have been devised by which the necessary supply could be preserved or secured for the dry season.

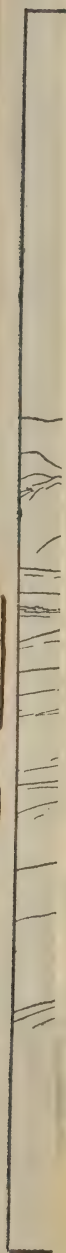
The quadrangular grouping of structures was almost universal, the four substructures consisting of oblong pyramids, one or two of which were of commanding height and the others low and narrow. The indications are that the loftier piles were stepped and faced with cut stone or cement. The amount of hewn and sculptured stone employed was very limited, a result of the almost complete absence of any easily worked stone. The hearting of the masses was of stones, earth and mortar, extremely heterogeneous in arrangement, and probably, on account of the situation, assembled at great expense of time and labor. The floors of terraces and buildings were of cement or plaster, and the superstructures, now represented by much reduced masses and remnants of walls, were apparently built largely of small, irregular stones, faced up on the surface without much dressing and no doubt finished in plaster. In plan the superstructure was always extremely simple, and probably varied little from the plain rectangle. The entrance was reached by a stairway on the side facing the court. Nothing remains to tell the story of the elevation, the roof and the embellishment; but the general likeness of the remains in all visible features to the well-preserved structures of Mitla leaves little room for doubt that they were much the same in all essentials. Orientation seems to have been considered with much care, as but few structures fail to conform with approximate accuracy to the points of the compass, no matter what the character and trend of the sites occupied.

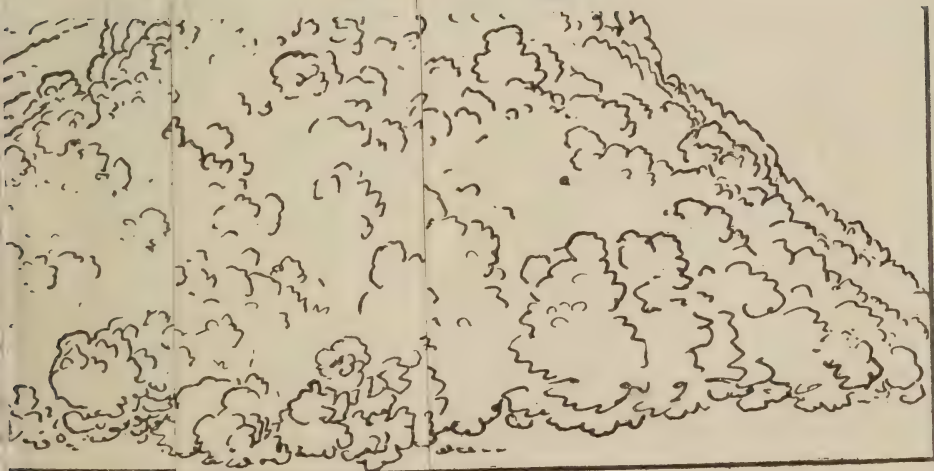


A. Monte Alban, showing pyramid-notched profile. B. Crest of Lesser Alban. C. Upper Suburbs of the City of Oaxaca. D. Point of view for Panorama of Ruins, Pl. XXVII. E, E. Extent of Map of Summit, Pl. XXVII.
F. Quadrangle at west end of the Lesser Alban. G. Summit Quadrangle. H. Quadrangle on spur facing City. I. Extreme south end of Monte Alban.

PANORAMIC VIEW OF MONTE ALBAN FROM THE LESSER ALBAN.
LOOKING WEST.

PL. XXVI. PANORAMIC VIEW OF MONTE ALBAN FROM THE LESSER ALBAN.





ge of Pyramids.

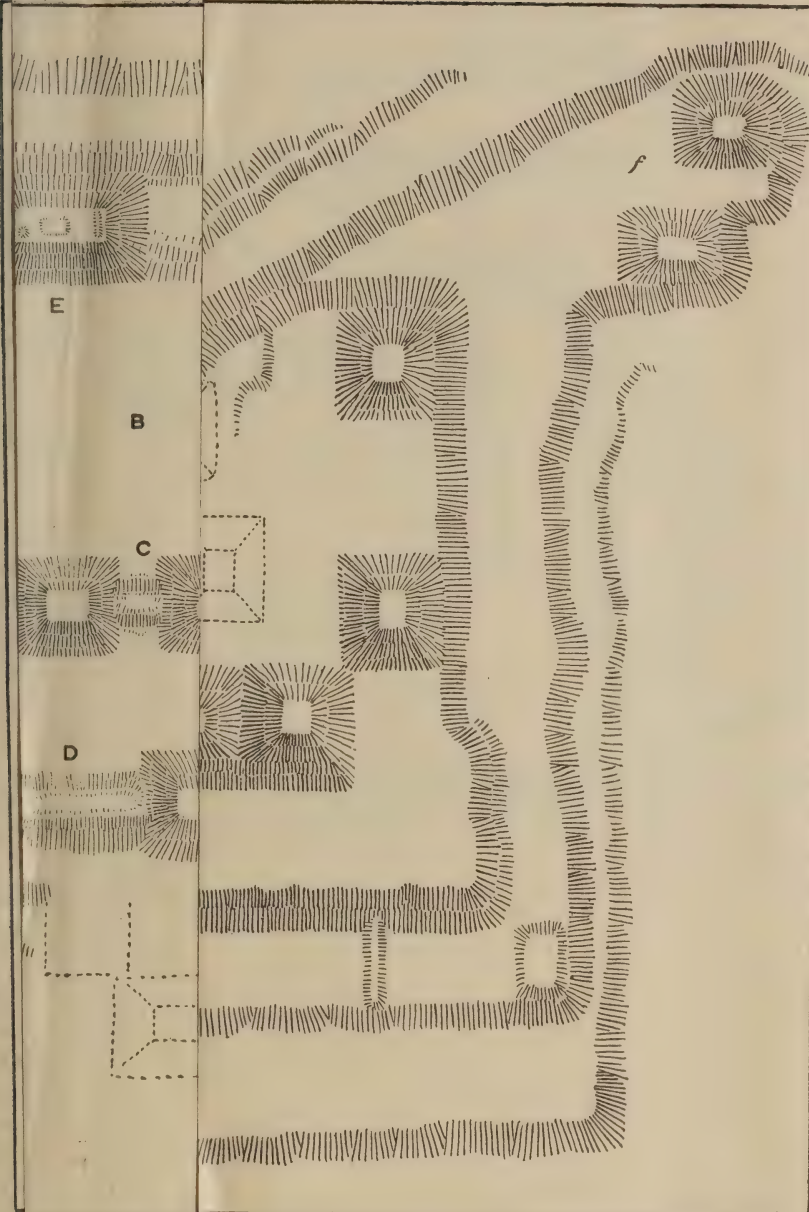
Spur with Ruins.

J J. Hills crowned with ruins.



A. Main Southern Terrace with Pyramids. B. Great Plaza. C. Central Group of Pyramids. D. Eastern Range of Pyramids. E. Western Range of Pyramids. F. Great Northern Group of Pyramids. G. Spot with Ruins. H. The Lesser Altar. I. City of Oaxaca. J. Hills crowned with ruins.

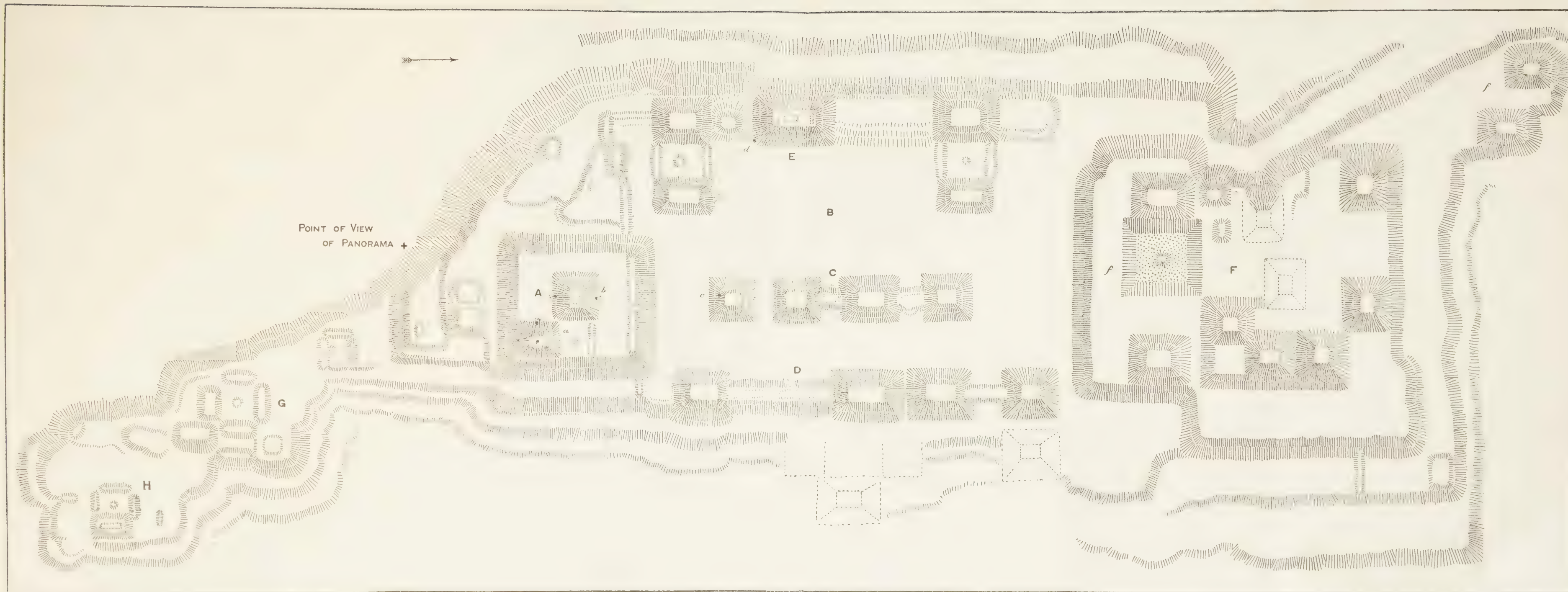
PANORAMIC VIEW OF SUMMIT REMAINS, MONTE ALBAN.
LOOKING NORTH.



F. Great Northern Group of Pyramids.

D. E.

REMAINS C
200 FEET TO THE I



SKETCH-MAP OF SUMMIT REMAINS OF MONTE ALBAN.
SCALE ABOUT 200 FEET TO THE INCH.

RUINS OF MITLA.

THE JOURNEY. The trip from Oaxaca to Mitla, a distance of thirty miles, was made by stage over the well-traveled thoroughfare that leads to the east and southeast toward Tehautepec. We passed the whole way through broad valleys dotted with villages and farms and bordered by the same brown slopes and monotonous and barren-looking mountains that characterize the vicinity of Oaxaca. The geology changes from the older sedimentary formations outcropping west of the city and in Monte Alban to massive volcanic products among which gray and greenish trachytes take a prominent place. There are traces of ancient occupation here and there along the road, and about ten miles out we passed a low ridge on the right which is crowned and serrated by a number of quadrangular groups of mounds similar to those seen in such great numbers on Monte Alban and the lesser ridge west of Oaxaca. Late in the afternoon we turned to the east around a bold trachyte promontory, and soon reached the town of Mitla, nestled away in a broad amphitheater-like valley surrounded completely by mountains.

MODERN MITLA. The ancient site is now pretty fully occupied by a modern village, consisting for the most part of thatched houses of poles and cane obscured by clusters of trees and cactus fences. The churches, market place, and some of the principal houses are built of stone derived very largely no doubt from the ancient buildings, and adobe is also used to a considerable extent. The location was probably selected by the ancient occupants because it was the lower limit of water supply in the dry season. The creek is supplied by springs rising in the mountains to the east, and passes through the city between abrupt clay banks often twenty feet in height. In the wet season the flow extends into the lower valley, but in the winter it barely suffices to supply the village with water for domestic purposes and for stock. The larger part of the town is located on a partially isolated terrace on the south side of the stream. Here we have the market place, the store and the hotel, the latter being well kept in a commodious house by a Mexican family. On this side, also near the creek, there are the remains of a quadrangular group of buildings, represented by four ruined pyramids, and traces are seen of what appears to be another group between this and the steep bank of the creek. In the central part of the village, where recent building and rebuilding has been most active, there must have been other struc-

tures, now wholly effaced or obscured by modern buildings or accumulations of debris. As a building site this elevated level space would seem to be superior to the irregular slope on the opposite side of the creek where the great groups of buildings are found. The ground on the north side slopes at a gentle angle from the low bluff to the banks of the creek and is cut by two or three gullies or arroyos. Next the creek the space is covered with modern dwellings, and here the ancient buildings—such as existed—are practically obliterated.

The better preserved groups of ruins are on the outskirts of the village several hundreds of feet from the stream, and to this circumstance they owe their escape from destruction. There are but few houses in the desolate-looking valley outside of the village.

The inhabitants, a homely, squalid people, are largely of the native Zapotecan stock and live in a most simple manner, cultivating the soil, keeping some sheep and cattle, and still practising in a small way a few of their aboriginal arts. The weaving of coarse woolen fabrics, as illustrated in Pl. XXIX, is carried on by many families.



FIG. 72. IRON AX IN USE TO-DAY, MODELED AFTER THE ANCIENT STONE CELT; AND AN IRON KNIFE OR MACHETTE OF PECULIAR SHAPE, HAFTED IN PRIMITIVE STYLE.

The most interesting specimens of their handiwork are their metal tools, which are extremely primitive, the ax, for example, being a chisel-like blade of iron almost exactly duplicating the well-known ax or celt of the ancient aborigines. It is set in a handle of tough wood, just as were the stone and copper axes of early times. A piece of tough wood some two feet long is worked down into a rough handle at one end, while an enlargement at the other end is perforated for the insertion of the blade. The knife or machette is equally simple and the manner of inserting the short blade is very curious. The



MITLAN WOMEN SPINNING AND WEAVING.

spade, hoe and other agricultural tools are hardly less interesting. I brought away several specimens, including the ax and machette shown in Fig. 72.

THE ANCIENT REMAINS. The ruined structures of Mitla are better preserved than those of any other group in Mexico proper, but are not so extensive as are the remains of Monte Alban or San Juan Teotihuacan; neither does it appear that they represent a city comparable in size and importance with these places, or with others in Yucatan and Guatemala. But they are surpassingly interesting and bear out the impression, given by each great site in turn, that the pre-Spanish peoples had developed in certain lines, and especially in the temple building art, far beyond the stage of advancement ascribed by common estimate to the native races.

The art of Mitla, as represented by the architectural remains, was highly individualized and hence presents many novel features—a result due in large part, no doubt, to the isolation of the people and the peculiarities of their environment. Many features of plan, profile, construction and finish are new to the student who has paid attention chiefly to Nahua and Maya building, and the system of embellishment seems to stand alone, even in the province to which it belongs. The mural decorations are purely geometric, and in appearance are in striking contrast with the mythological, life-form designs so prevalent throughout other sections of Mexico. Much has been said by various authors regarding the significance of these and other peculiarities of the architecture, and some have predicated upon them marked distinctions of race, but such characters of art, standing alone, have no great value as ethnic criteria.

With respect to the mechanical perfection of Mitlan work in stone, it may be said that environment probably had much to do with it. The trachytes that surround Mitla break down in great blocks along the cliffs and are the most tractable and easily manipulated of the building stones. Monte Alban furnished nothing but flinty quartzite and gnarled crystalline limestone; San Juan Teotihuacan had mainly the most intractable forms of basaltic lavas. Such rocks do not lend themselves to the pick of the quarryman and the chisel of the sculptor, otherwise these two cities would probably have contained examples of architectural achievement unequalled in America. Mitla is what it is largely because of the presence of inexhaustible supplies of superb and easily worked building stone—the soft, massive, yet tough and durable, trachytes.

Mitla has been described in recent years by a number of visitors, including Charnay and Bandelier, but it has not been adequately

explored by anyone, and even the visible features have been but meagerly presented to the world. Although my own studies here were more full and careful than in the other cities, I cannot hope to cover the whole ground. Bancroft* has reviewed the literature of the site, and Bandelier† has discussed the people as well as the literature, and has published elaborate measurements and descriptions of the buildings. Charnay‡ gave to the world a superb series of photographs, but has published few original observations. I shall give first attention to the presentation of a panoramic view and then take up in some detail matters pertaining to construction and decorative elaboration, and to the quarrying and cutting of stone.

PANORAMIC VIEW. The situation of Mitla is such that a point of view comprehending even the main structures in a satisfactory manner, is difficult to secure. The mountains are too far away to furnish points of observation, and the bluff, which rises just back of the ruins on the north side, is so situated that from it the buildings have a tame and squatty look; and the colors of the stonework, all somber grays and browns, are so blended with the gray adobe plains and russet slopes that no effect of relief or contrast can be obtained. Besides this the village and its clusters of dark foliage are spread like a veil over the site, obscuring the various remains. Not being able to secure an elevated point that would serve my purpose it became necessary to assume a point of view and construct the panorama. The point selected was a little to the east of the best preserved group of ruins and high enough to display all the groups clearly. In order to secure accuracy, each ruin was studied with great care from every available point, and photographs were made with the same end in view. In the very elongated panoramic view presented in Pl. XXXVIII we look to the west down the valley of the Rio Mitla. The foliage is for the most part omitted, and the whole scene is simplified with the view of bringing the ancient buildings out in better relief. The stream course with its vertical clay banks meanders the site at the left and passes beyond, disappearing between the interlocking terraces which slope up in long monotonous lines to the fine mountain range at the left, and on the right connect with the bold spurs that come forward into the valley from that side.

A conspicuous feature of the landscape is a hill quite isolated from the remainder of the highland and somewhat suggesting—mainly because of its ruins—the Acropolis at Athens. This bears on its

*Native Races, Vol. IV, p. 388.

†Archæological Reconnaissance into Mexico, p. 263.

‡Ancient Cities of America, p. 500.

summit an ancient fortress, the walls of which, and the ruined buildings within, are plainly seen from Mitla with the naked eye. In the distance the valley turns to the right around a lofty ridge, and the blue ranges beyond close the view to the west.

A brief study of the accompanying map, Pl. XXXIX, in conjunction with the panorama, will aid greatly in securing a clear notion of the relation of the buildings to each other and to the site. The point of view for the panorama is indicated by a cross on the map. Five great clusters of buildings are more or less perfectly preserved, and it is possible that others could be traced if excavations were undertaken. The Group of the Catholic Establishment (I), near the bluff on the north side, consists of three coalescent or closely associated quadrangles; the Group of the Columns (II), a little lower down, includes three well preserved quadrangles; the Group of the Arroyo (III), still farther down, comprises three quadrangles; the Adobe Group (IV) to the right of this consists of but one quadrangle; and the South Side Group (V) on the opposite bank of the Rio Mitla, consists of two quadrangles. These structures are all located with approximate accuracy on the accompanying map, Pl. XXXIX.* It is possible that a sixth group was located on the favorable site between the Group of the Columns and the river, and it will not be surprising if foundations of one or more groups are at some future time discovered on the site of the market place in the center of the village.

ORIENTATION AND ASSEMBLAGE. The ruined buildings occupy an area not more than two thousand feet from north to south and less than a thousand feet from east to west. Their orientation is exceptionally uniform; the walls do not vary in any case more than 4 or 5 degrees from the magnetic points as indicated by a compass not liable to an error of more than 1 or 2 degrees. This uniformity is rendered more notable by the fact that there is considerable variety in the materials and construction of the structures as if they had been built at different times or under unlike conditions.

THE BUILDING MATERIALS. Stone and adobe were the chief materials employed in the buildings that now remain, but wood was used to a large extent and must have been employed extensively in the less important buildings and in the construction of dwellings. Although there are workable sandstones and some beds of limestone

* To those familiar with the sketch map of Mitla published by Mr. Bandelier in his "Mexico," the definiteness and regularity given the forms of the ruins in my map may seem an exaggeration. Mr. Bandelier has chosen to present the forms of mounds as they appear to-day, encumbered and obscured by modern buildings, walls and fences, at the same time failing to do justice to the symmetry and the accuracy of line and angle of the buildings. I have endeavored to show the standing structures exactly as they are, and besides have tried to express in dotted lines something of what is definitely known or safely surmised of forms now represented by remnants merely.

exposed in the valley, the trachytes were preferred, and these are unsurpassed as building material even by the massive limestone of Yucatan. The convenience and tractable nature of the trachytes encouraged the use of large masses, and there are now to be seen in the various buildings upwards of fifty lintel stones, ranging from 10 to 20 feet in length and from 2 to $4\frac{1}{2}$ feet in each of the other dimensions, the weight varying from 10 to 15 tons; besides these there are more than twice that number of columns, jamb-stones and ceiling slabs of only slightly inferior proportions. Hundreds of others have been destroyed or lie buried beneath accumulations of debris. The quarrying, dressing and handling of these stones required great expenditure of labor on the part of a primitive people. But the numerous buildings also required vast numbers of smaller hewn stones for facing the walls—exterior and interior, and the number of small dressed bits employed in the geometric mosaics is almost beyond estimate.

Beside the cut stone employed in building, other materials were required in vast quantities. Rough stone had to be gathered from the bluffs and mountain slopes for the interior mass or hearting of terraces, pyramids and walls; adobe, to be obtained in unlimited quantities in the vicinity, had to be mixed and transported at all stages of the work as a matrix for the stone, and beside was made into bricks for the construction of one, at least, of the great groups of buildings; then there was cement or concrete made of lime mixed with gravel for the laying of roofs, floors and pavements. There occur also in the adobe mortar of the walls countless flaked flints which will be referred to in another place.

There were required also great quantities of paints, mainly mixtures of whitish earths and iron oxides, with which the buildings were washed within and without—not only once but at frequent intervals—so that in days of prosperity the city must have presented an attractive and brilliant appearance.

Lastly, we must not overlook the use of wood. This material was probably not extensively used in the stone buildings save in the construction of ceilings or roofs. That stone also was used for this purpose in some cases is readily seen, although wood was employed for all long spans; in the northwest hall of the Quadrangle of the Grecques the end sockets of several ceiling beams and the impression in the mortar matrix of one round side are still preserved. According to this evidence the timbers used were about 12 feet long by 12 inches wide and 7 to 9 inches thick. They were probably hewn flat on the upper and under sides. Larger timbers must have

been used in the wider spans of the Hall of the Columns, and in several other buildings. The buildings now existing or distinctly traceable would have required some 1,500 beams if spaced as indicated by the sockets referred to above. The cutting of these timbers was no insignificant work for a people whose implements were much better suited for shaping stone than wood.

MASONRY. The masonry of the Mitlan buildings is of a superior order, and all are forced to admire the precision of the stone laying and the stability of the work. The erection of one of these massive piles was a great undertaking for stone age builders, and must have consumed a vast deal of time. When the character of the building had been decided upon and the plans sufficiently matured, the hewers of stone, the carriers of water, and the compounders of mortar, assembled their materials on the chosen site and the mason began his arduous work. The low mass of the foundation terrace, composed of adobe and broken stone, was heaped up in approximate shape, and the courses of hewn stone were carried around the base and added one upon another; or, if the surface was to be finished in plaster, the facing was of undressed stone or rubble. Where dressed faces were required the rough hewn stone was brought forward in sizes assorted according to the course to be laid and each piece was trimmed and fitted to its place. The margins were so accurately cut that the joints required little mortar, but the back was rough and often somewhat pyramidal in shape so that it set more or less deeply into the mortar bed. Where the walls were plain the stones were shallow; but where decided variations of profile occurred certain pieces were long and penetrated the rubble mass behind, binding the structure firmly together as shown in some of the accompanying sections.

It has been stated by some visitors to Mitla, and repeated by several writers, that mortar was not used in laying the cut stone. This I find to be only partially true. It seems to have been the aim of the builders to make the joints so perfect that lines of junction would be invisible, and this was practically accomplished in many of the most prominent portions of the work; but it is found that in some places, especially in the mosaic work and about the margins of the large lintel and jamb-stones, mortar was freely used to fill out spaces and even up the surfaces. The mortar was of excellent quality and where surfaces were to be finished in color there was no good reason for avoiding its use in the manner indicated.

In all of these buildings there was very little simple stone laying, where sizes and angles were uniform and course followed course as in brick work. A few courses here and there are continuous all

around the building, but nearly every course was a special course, differing in width, angle, or projection from its neighbors, and nearly every stone was a special stone, cut and fitted to its individual space.

SUBSTRUCTURES. Pyramid building was not so important a feature with the Mitlans as with other great builders of Mexico. Two of the principal groups of buildings rest on the unmodified, or slightly modified, surface of the ground; the terraces of a third are not over 12 feet high in any part, and the fourth and fifth groups have one pyramid each 25 feet high, with others of inferior height. Altogether there are five quadrangular groups having substructures for all their buildings, although all are not well defined at the present time. The fully developed pyramid was built in steps, ranging, so far as can be made out, from 6 to 10 feet in height. Only one example remains in which these steps are preserved, and that is the east structure of the South Side Group. If the drawings published by Dupaix are to be relied upon, one of the groups—probably that of the Adobes—had all four of the pyramids terraced, three with two stages each and one with four (*b*, Fig. 73). The faces of the terraces are nearly vertical and were finished in some cases with cut stone and probably in other cases with plaster or cement. The floors of the terraces were of cement and possibly in some instances of stone, and are not more than 4 or 5 feet in width in any case.

The hearting of the pyramids and terraces was of irregular stones, set in adobe mortar, or of adobe bricks—the latter material prevailing in only one group which I have called the Group of the Adobes.

The horizontal dimensions are only such as to accommodate the superstructures and leave space for the narrow esplanade and terraces. The largest are about 145 feet in length and 60 feet in width. Many were closely joined at the corners of the quadrangle and some



FIG. 73. EXAMPLES OF MITLAN PYRAMIDS OR SUBSTRUCTURES.

a. Platforms of buildings in the Group of the Columns.

b. Pyramids of the Group of the Adobes, as given by Dupaix.

were coalescent at contiguous corners to their full height; while in one case at least the four members of a quadrangular group were entirely coalescent, the buildings also being joined. Examples are presented in Fig. 73.

It is unfortunate that no example of a stairway has been preserved, and I cannot recall having seen a step, or the trace of a step, in Mitla. Early plans and drawings show stairways in the Group of the Columns, leading from the courts into the inclosing buildings, and in the subterranean passageway of the south quadrangle of that group. Judging by the general style of the stonework, and the width and elegance of the doorways, the stairways must have been commodious and well built.

SUPERSTRUCTURES. The buildings of Mitla have been called temples by some, palaces by others and communal houses by still others, but the function is and must be largely a matter of conjecture. On general principles I would incline to attribute their erection to religious inspiration, but in their plan and arrangement they do not correspond closely with the specialized and generally isolated temples of Yucatan and other sections of Mexico. Communal use is strongly suggested, and the secluded courts would have afforded convenient retreats for the women of the community or for special social or sacerdotal groups.

THE GROUND PLAN. The ground plan is simple, as in other sections of Mexico, presenting only a limited number of exceptional features. As a rule the buildings are long and narrow and contain but a single chamber. In the north building of the South Side Group there are traces of partition walls, and I observe, also, that two of the buildings within the walls of the fortified hill south of Mitla have partition walls apparently belonging to the original construction; but as these buildings may have been remodeled, more or less completely, for use by the modern inhabitants, it may not be safe to speak of this feature as certainly belonging to the original structures. It is to be noted that the buildings in which the partitions occur are in several respects distinct from the structures of the central group, and may belong to a later date if not to a distinct period or occupation.

The ground plans of the various buildings are shown—on a small scale—on the accompanying map. It is seen by these, as well as by the panorama, that there are five clusters or groups of structures, numbered—beginning at the north next the trachyte bluff—I, II, III, IV, V; and for convenience of description I have named them—in the same order—the Group of the Catholic Establishment, the Group of the Columns, the Arroyo Group, the Adobe Group, and the South Side Group. Group I comprises three quadrangles, lettered—beginning at the north—A, B, C. Group II has three quadrangles, lettered D, E, F. Group III has three quadrangles, lettered G, H, I. Group IV has one quadrangle, lettered J. Group V has two quadrangles, lettered K, L.

Before proceeding to give numbers to the separate buildings an analysis of the grouping of the buildings is necessary, as otherwise the reasons for separate numbering may not be apparent. The enumeration of twelve quadrangles might lead to the expectation that four times that many buildings would be found, but this is not the case, as the buildings do not all stand apart but are joined in various ways and in some cases appear to fully coalesce, whereas in other cases there are omissions of single buildings. Three types of arrangement may be illustrated: In *a*, Fig. 74, a simple symmetric quadrangle

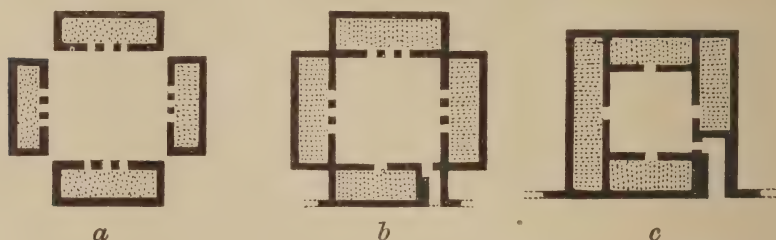


FIG. 74. VARIATIONS IN ASSEMBLAGE OF THE BUILDINGS OF A QUADRANGLE.

a. Separate and symmetric placement of the four buildings.

b. Four buildings joined at the inner corners, and having a special entrance way.

c. Condensed arrangement with special entrance way.

is shown in which the four separate buildings inclose a court open at the corners. In *b* the four buildings are joined at the inner angles, inclosing the court with a continuous wall. There may be combinations of *a* and *b* in which one, two or three of the corners are open. In *c* two of the buildings are set in so far between the others that the structures become practically a single structure with four rooms, inclosing a court. The two inserted buildings form short chambers.



FIG. 75. ASSEMBLAGE OF QUADRANGLES IN CLUSTERS.

a. Arroyo group.

b. Group of the Catholic Establishment.

Now in the combination of these quadrangles into clusters other modifications of the plan take place, which must be kept in mind if a clear notion of the ground plan is to be secured. In a wholly

independent grouping of three quadrangles the arrangement could be extremely varied. An ordinary placement is shown in *a*, Fig. 75, but combinations may be made as indicated in *b*, where two adjoining quadrangles make use of one building in common, thus eliding one member. The only example that needs especial explanation is that occurring in Group II, where the northern quadrangle, *D*, is not only closed completely, as shown in Fig. 93, but its south wall becomes the north wall of the adjoining quadrangle *E*, and the combined structures, connected by a passageway, become practically one building of five chambers, and as such they have generally been regarded. Proper analysis demands that each of these chambers be treated as a member of a quadrangle. The numbering of the whole series of units (see map), beginning at the north—the letters belonging to the quadrangle and the figures to the buildings—will be as follows: *A*, 1, 2, 3, 4; *B*, 5, 6, 7, 8; *C*, 8, 9, 10, 11; *D*, 12, 13, 14, 15; *E*, 16, 17, 18, 19; *F*, 20, 21, 22, 23; *G*, 24, 25, 26, 27; *H*, 28, 29, 30(?), 31; *I*, 32, 33, 34(?), 35; *J*, 36, 37, 38, 39; *K*, 40, 41, 42, 43; *L*, 44, 45, 46(?), 47(?).

The diversity in the arrangement of building units gave rise to much diversity in the manner of securing access to the courts and chambers, as shown clearly in the ground plans. There is practically no exterior doorway in Mitla. Courts were entered by openings between buildings at the corners, but these openings were not treated as doorways since the corners of the buildings remained normal. Courts with closed walls were entered by narrow passageways from an adjoining open court. The individual buildings were, in all or nearly all cases, entered from the courts.

As indicated in the plans, the buildings—keeping the fundamental unit of construction in view—are long and narrow, the width being limited by the capacity of the ceiling span to a single beam length—not over 12 feet—or to two beam lengths—not over 23 feet. The duplicate series occurred in exceptional cases only. The length was not necessarily limited. The greatest exterior width is about 30 feet (that is 23 feet, plus the thickness of the two walls), and the greatest exterior length is 133 feet. The doorways occur singly or in groups of three. The only other features of any particular moment, appearing on the plan, are the columns ranged along the middle of the double-width apartments, the poorly defined central piles of debris in the courts, and the strangely arranged subterranean chambers of building 20. The latter will be illustrated in connection with the description of that building.

PROFILE AND CONSTRUCTION. In viewing these buildings I am constrained to believe that the details of construction must have been well

made out before the foundations were laid or the mason began to place his facing of cut stone. So complex and varied is the mural treatment that haphazard work is out of the question. If there were no elaborated drawings to place in the hands of the mason there must have been at least a master mind to predetermine the general treatment and superintend every detail.

The walls of these buildings are quite as massive as those of Chiapas and Yucatan, many being over four feet in thickness. They are carried up vertically, or nearly so, to the full height of the building, and are faced with dressed stone or with plaster. In general the treatment of the exterior walls and of the façades proper (which look in upon the courts) is much the same. The inner walls of chambers or halls are either plastered or partly or wholly covered with geometric mosaic-work. Exterior walls are not broken by openings of any kind. The doorways, arranged singly or in threes, occupy the centers of the inner façades, so that entrance is obtained from the courts. In three cases, at least, closed or boxed courts were entered by narrow passageways from contiguous halls of adjoining quadrangles, as best expressed on the ground plans.

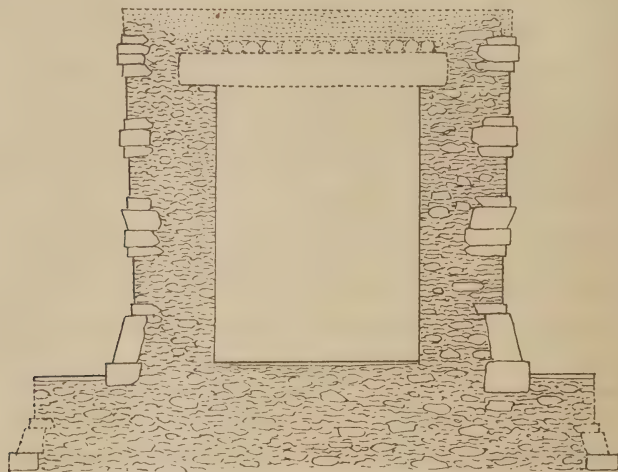


FIG. 76. TRANSVERSE SECTION OF BUILDING OF SINGLE BEAM SPAN.
The beam and roof are restored in broken lines. Width, 10 feet.

The buildings are only a single story in height and there is no trace of a second story or of an attempt to give additional effect of height by means of false fronts or roof-combs. The arch was not used and ceilings and roofs were flat. In constructing the roofs the lateral walls were connected by cross beams of wood, now entirely obliterated, or, where the covered space was very narrow, by slabs of

stone. The height of the exterior wall rarely reaches 15 feet, and the height of the ceiling was seldom over 12 feet. The roof was 3 or 4 feet thick, and consisted of the ceiling timbers overlain by stone, by cross timbers or by pliable vegetal materials covered with rubble and cement. The roof surface appears to have been of cement and was level or sloped only enough to give necessary drainage.

The entire construction, so far as made out, is clearly shown in Figs. 76 and 77, and details of the roof, which must remain somewhat conjectural, are indicated in dotted lines. Where single lengths of beams were used, as in Fig. 76, the chamber or hall does not exceed 12 feet in width. Where a wider space was desired a row of pillars or columns was planted along the middle of the inclosure, timbers were laid longitudinally connecting column with column, and other timbers in two courses were laid across connecting the longitudinal series with the sidewalls, as indicated in Fig. 77. By means of this

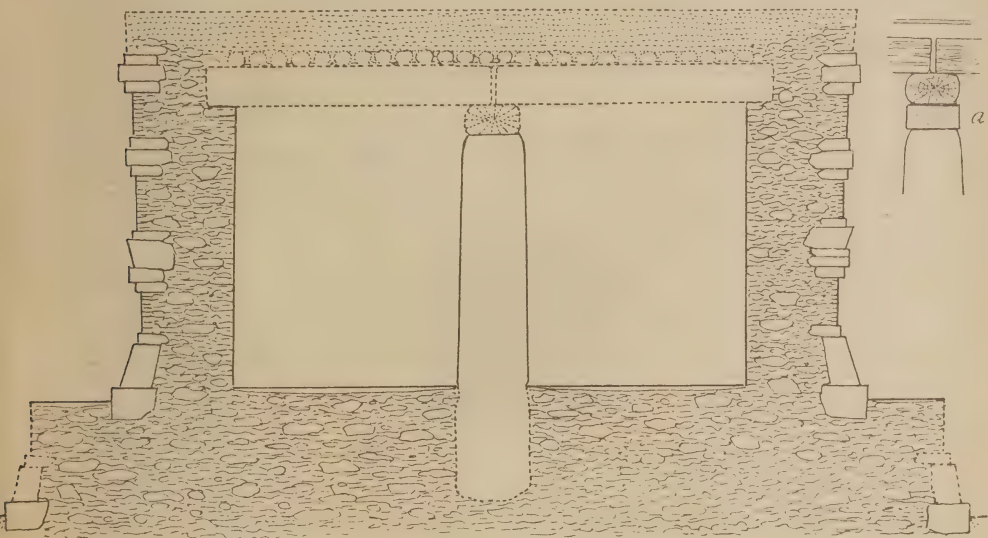


FIG. 77. TRANSVERSE SECTION OF BUILDING OF DOUBLE BEAM SPAN.

The beams and roof are restored in broken lines. Width, 22 feet.

device at least three of the halls were given a width of from 20 to 23 feet, and the width between the columns was about equal to the space between the columns and the lateral walls—the extent of a beam span—so that these halls were really very spacious, though necessarily low and gloomy. So far as I could determine there was no variation from the arrangement here indicated. Where slabs of stone were used instead of the wooden beams the covered spaces were limited to a width of 6 feet or less.

DOORWAYS. The doorways of the Mitlan buildings are in no case exterior to the quadrangle but enter from the courts. They are almost always central to the building, and occur singly or in groups of three, according to the length or importance of the façade to which they belong. As in the Maya cities there are no indications of the employment of fixed doors by the original occupants. The opening is not so large as in the Maya structures; the height never exceeds 7 feet and the width is but little greater. Though somewhat complex and varied in effect as the result of offsetting, paneling and other forms of embellishment, the doorways are all entirely simple in construction, involving no new or exceptional principle or feature. They embody but the three essential members, the sill or floor, the vertical jambs and the horizontal lintel. A typical example of the single doorway, showing details of construction, is illustrated in Fig. 78. It has

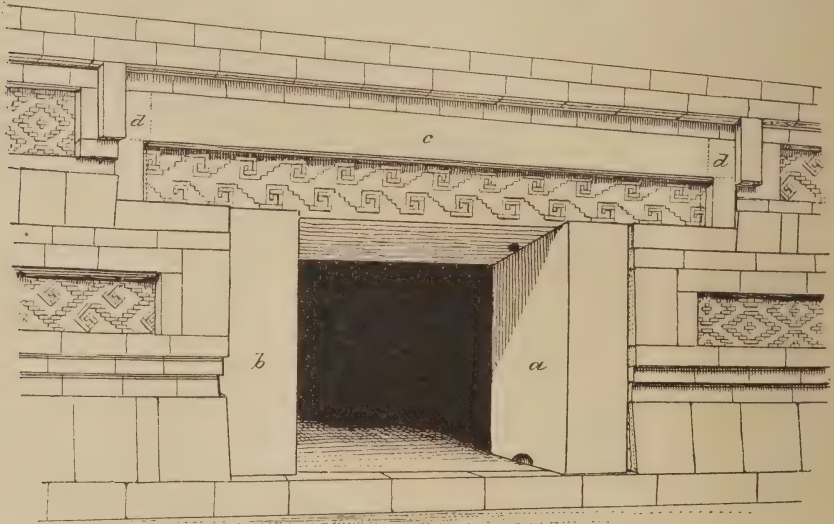


FIG. 78. CONSTRUCTION OF SINGLE DOORWAY, EMPLOYED WHERE SPACE WAS LIMITED.

This example leads from the court of the grecques to the west chamber. *a* and *b*, massive jambs; *c*, upper undecorated portion of lintel; *d*, *d*, stones added to give lintel-space desired length, Jamb-stone on left side restored. Height of opening, 5 feet 5 inches.

a clear cut and substantial look that is highly pleasing. The lintel is 12 feet 6 inches long, 2 feet thick and 3 feet 6 inches through from front to back. It is paneled on the exterior or front face, and the sunken surface is occupied by lines of beautifully sculptured fretwork; the back is flat and flush with the grecque-covered chamber wall and is sculptured in continuation of the lower zone of grecque mosaic. As indicated in the drawing the great stone used fell a little short of

the length desired for the lintel panel and small stones (*d, d*) were added at the ends, but so neatly adjusted that it is difficult to detect the joints. On the under side of the lintel, near the ends of the exposed surface, there are two round holes a few inches in diameter and depth, probably drilled by post-Columbian occupants for the hanging of some form of door. The jamb-stone is 5 feet 5 inches high, 3 feet 7 inches in width, and 16 inches thick. It is entirely plain, save that at the base, as shown in the figure, there is a roughly excavated depression, made probably, as was the hole in the lintel above, to aid in swinging a doorway. The faces of these stones, where protected from the weather, show traces of a very thin coating of hard, highly polished plaster. The sill is faced with dressed stones set on edge and continuous with the lower course of the wall; it is about 7 inches above the floor of the court in front and on a level with the cement floor of the inner room, the cement coming forward to the facing stones. The mural masonry framing in the doorway and the adjacent panels of fretwork is indicated at the right and left.

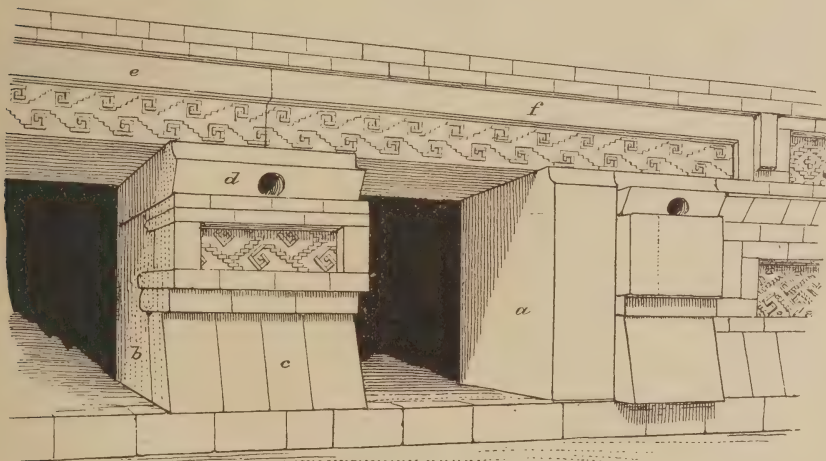


FIG. 79. CONSTRUCTION OF TRIPLE DOORWAY, ONE-HALF ONLY BEING SHOWN.

- a.* Lateral jamb-stone with decorative projection at right.
- b, c.* Pier separating doorways, with embellished facing of cut stone, with plastered sides (*b*) and heavy capstone (*d*).
- d.* Socket in capstone for porch or awning beam.
- e.* Part of middle lintel.
- f.* End lintel.

Height of opening, 6 feet 7 inches. Full length of lintel, about 48 feet.

In the larger buildings triple doorways were used (Fig. 79) which occupy the center of the façades facing the courts. The builders were evidently ambitious to give these portals a superior degree of importance, and, though low and formal, they are really striking features.

In appearance they present marked contrasts with the Yucatec portals, but differ little in general characteristics from the pillared doorways of Palenque. The only really great feature is the lintel, which is in some cases upwards of 50 feet in length. It is invariably composed of three sections which meet over the piers, the outer ends extending several feet into the masonry of the wall. The lower half of the exterior face is always sunken or recessed a few inches, and is occupied by sculptured fretwork or by painted designs. The front and under surfaces are always well finished, but the top, hidden by superincumbent masonry, is left unhewn. In the preserved examples there are but two jamb-stones, placed one at the extreme right and the other at the extreme left, while the piers are built up of hewn blocks without and plastered masonry within. The lateral and inner surfaces of the piers are plain, but the exterior face is varied by offsetting and paneling, and near the top in each case a hole has been drilled, probably for the insertion of the framework of an awning or roof intended to shade the stairway and entrance. The jamb-stones at the extreme right and left are quite plain, but, as indicated in the drawing, they are supplemented on the outer side by a peculiar feature which repeats in a measure the effect of the pier fronts and gives necessary balance to the effect. The piers are in all cases capped with large, squarish stones supporting the lintel and holding together the masonry beneath. The masonry, framework and mosaic panels surrounding the portals are of the usual types and are well illustrated in Plates XXXI and XXXIV.

Much simpler than the main doorways are the entrances to the dark passageways leading into the boxed courts. These accord in

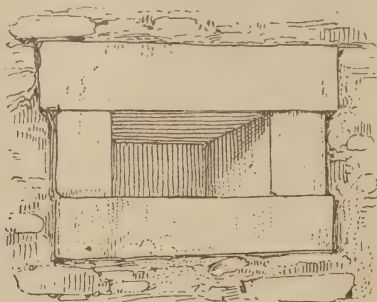


FIG. 80. NICHE IN THE BACK WALL OF PRINCIPAL HALLS.
That in the Hall of Six Columns is 30 inches wide, 17 high and 23 deep.

style with the wall into which they are introduced, resembling the single doorway described above when penetrating stone-faced and

paneled walls, and framed in by heavy lintel and jamb-stones when in plastered walls.

The only additional wall variation, aside from the decorative features, are certain niches or oblong, rectangular recesses in the rear wall of the chambers, always facing the entrance and 5 or 6 feet from the floor. They are about 2 feet in length, 18 inches in height and 20 inches deep, and are faced with dressed blocks, as seen in Fig. 80. Their use is a matter of conjecture, but their general presence and uniform position indicate that the function was of considerable moment. Possibly they were shrines and served to contain some sacred object—an image or symbol—to be saluted on entering the doorway.

COLUMNS. In Yucatan round columns were used in the doorways forming rudimentary porticos or colonnades, and also in the interior of the buildings as vault supports. In Mitla their use was confined to the interior, where they were employed chiefly to support the horizontal roof timbers of the wider chambers. There are but three or four halls so wide as to make such roof supports necessary, and in two of these—the north and east halls of the Quadrangle of the Columns—the fine shafts are still standing, the full number—six—in the north hall, and two only in the east hall where there were, I believe, originally five. All the missing specimens (supposing there were only eleven of like dimensions in the city) are accounted for; one lies in the court near the west side, and two form pillars for a porch at the eastern doorway (modern) of the quadrangle now occupied as a curacy. These columns are carved from massive trachyte and are about 11 feet in length above ground and perhaps 15 or 16 feet in full length. The diameter is from 30 to 36 inches below and falls off to from 20 to 24 inches above. In cubic dimensions they are nearly equal to the larger lintel stones, having a weight of some 6 or 8 tons. They are ranged along the center of the hall, and doubtless supported longitudinal ceiling timbers upon which rested the inner ends of the transverse beams, as indicated in several plates and figures. A smaller column occurs in the basement chamber in quadrangle F, where it supports heavy ceiling slabs; it is shown in Pl. XXXVI.

The height of the columns in the Hall of the Columns (11 feet to 11 feet 4 inches) is not quite equal to that of the lateral walls (apparently 12 to 13 feet), but the longitudinal beams, which we suppose to have rested upon them, would bring the level up to about that of the walls, thus giving a uniform level for the cross timbers. It is not impossible that capstones were used to give a little additional height to the columns.

ROOF CONSTRUCTION. Considerable speculation has been indulged in as to the kind of ceiling or roof support employed, but a close examination of the remains sufficiently indicates the use of wooden beams. Although the wood is gone the impression of the rounded

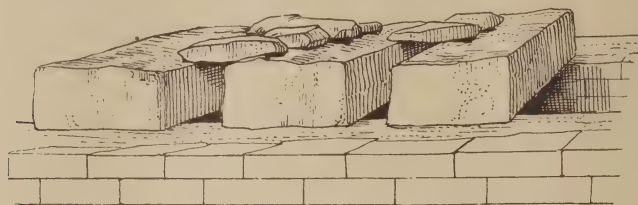


FIG. 81. USE (APPARENT) OF STONE FOR BRIDGING SPACES BETWEEN CEILING STONES.

side of one of the logs remains, and the sockets into which the ends were inserted are well preserved. These features are shown in Figs. 95 and 96. A more difficult question is that of the covering of the beams and the nature of the floor upon which the roof of rubble or

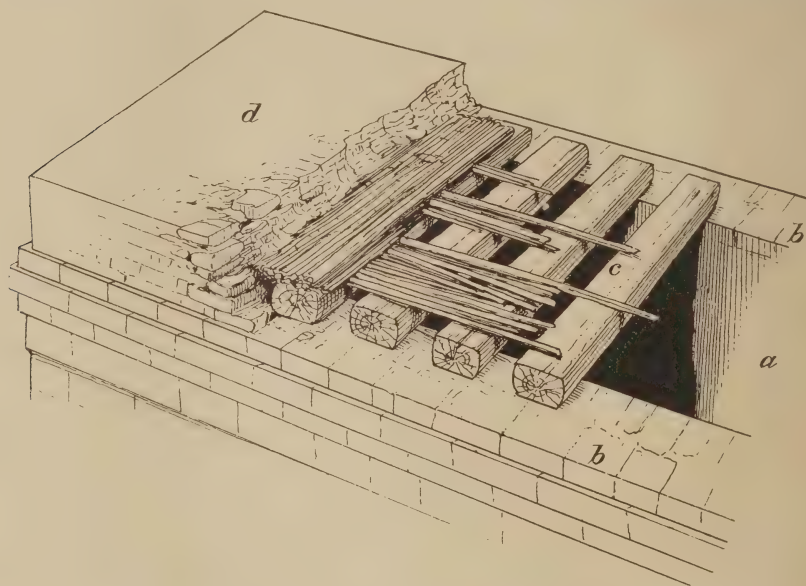


FIG. 82. THEORETIC ROOF CONSTRUCTION.

- a.* Chamber space covered.
- b, b.* Lateral walls.
- c.* Wooden beams with covering of small timbers or canes.
- d.* Superincumbent roof masonry with cement surface.

cement rested. Poles, twigs and matting have been suggested and all may have been employed though no trace now remains. It is observed that in places where ceiling stones are still in place the inter-

spaces show nothing but loose stones, Fig. 81, but these conditions are just such as would result from the decay of the more perishable parts and the consequent letting down of the superincumbent masonry.

The drawing presented in Fig. 82 is intended as an analysis of the roof construction, the assumption being that canes, poles or twigs rather than stones were used for the first course overlying the wooden beams. Illustrations of some details of roof construction appear in connection with the description of quadrangle D a little farther on. It is presumed that a bed of rubble a foot or two thick was laid on the interlaced vegetal courses and that coatings of cement were spread over all, forming the roof surface. But the portions remaining are not sufficient to make the whole construction clear and we are at a loss to say whether the surface was level or whether, as suggested by some slight remnants, it was sloped to facilitate drainage.

MURAL EMBELLISHMENT. The Mitlan buildings are exceedingly formal in profile as well as in ground plan. There is little departure from the simple, rectangular mass of masonry save that due to the doorways and the little niches in the chamber walls. The mosaic panels and the minor projections and recessings that serve to frame them in diversify but do not break up the solid façades; the relief is nowhere more than a few inches. The surfaces were uniformly covered within and without with some form of decorative finish and, though the chambers were necessarily very dark, as much attention seems to have been given them as to the most prominent façades. Three methods of embellishment were employed in treating the walls, viz.: Painting, sculpture and mosaic. So far as we know stucco was not used by the Mitlan builders in the modeling of relief work or statuary.

SCULPTURE. Sculpture in its more restricted and commonly accepted sense seems to have been tabooed as completely as if a priestly edict had been promulgated forever prohibiting it. The absence of sculptured life forms is especially remarkable since such forms were most extensively embodied in other branches of Mitlan art work. The several fragments of painted decoration preserved in these buildings consist almost exclusively of forms of animals and men, and in a style which has no suggestion of the formal geometric treatment characterizing the masonry embellishments. The Zapotec modeler in clay also was extremely fond of life forms, and treated them with a boldness not surpassed anywhere among a race of potters. The extensive use of life forms in art cannot, therefore, be denied the builders of Mitla. A few fragments of low relief sculpture employing life forms have been noticed within the limits of the present village, but no one

knows their origin or whether or not they have any connection with the ancient buildings. It is apparent that it was owing to no lack of capacity on the part of these peoples that sculpture did not take a place of importance. When the surface of one of the great lintels was to be finished in a style uniform with the geometric mosaics of the walls in which the lintels were imbedded, the chisel was used with excellent effect.

MURAL MOSAIC-WORK. Perhaps the most unique and remarkable feature of the Mitlan buildings is the fretwork decoration of the walls. It is found at present in two groups only—those of the Catholic Establishment and of the Columns; but it was probably employed in all the others, and I found some small cut stones of the kind used in the mosaics among the debris of the Arroyo group.

The fretwork designs are purely geometric, yet they are wonder-

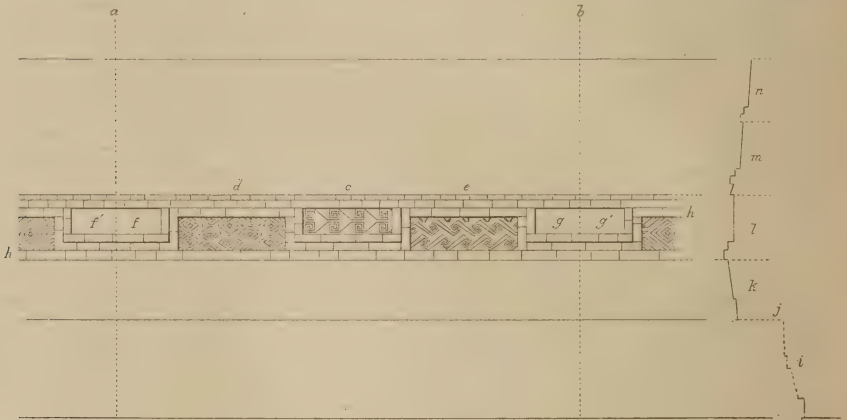
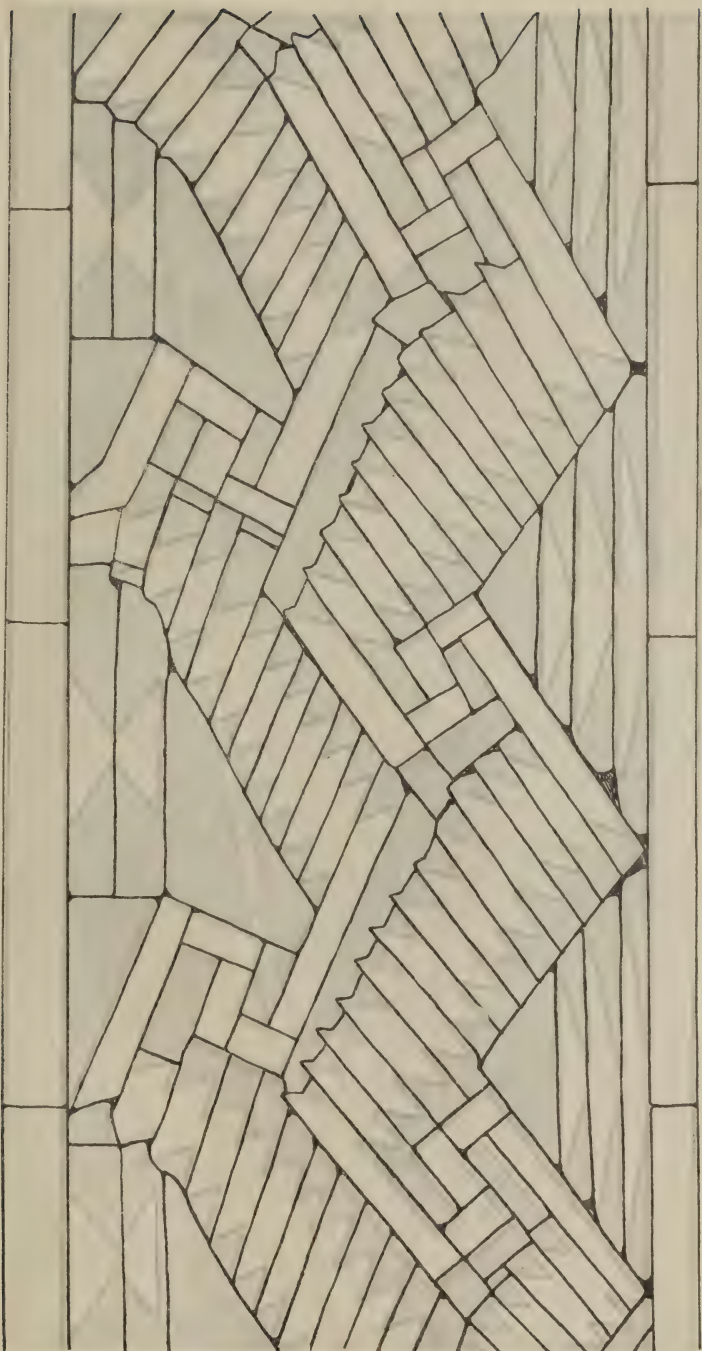


FIG. 83. CONTINUITY OF PANELED ZONES AROUND THE BUILDINGS.

The dotted lines *a* and *b* indicate the corners. The profile at the right is the corner profile; *c* is the middle panel of the wall *a, b*; *d* and *e* are the associated panels, and *f, f'* and *g, g'* are the corner blocks, the parts *f* and *g* belonging with the wall *a, b* and the parts *f'* and *g'* belonging to the adjoining walls. It is thus seen that the corner blocks are merely blank panels, though shorter than the panels proper; the meandering course of stone, *h, h*, incloses them precisely as it does the corresponding, decorated panels. The simplicity and consistency of the mural decorative work is thus clearly shown.

- i.* Terrace face.
 - j.* Esplanade.
 - k.* Two plain courses of stones at base of wall.
 - l.* Lower paneled zone.
 - m.* Middle paneled zone.
 - n.* Upper paneled zone.
- The coping courses are missing.

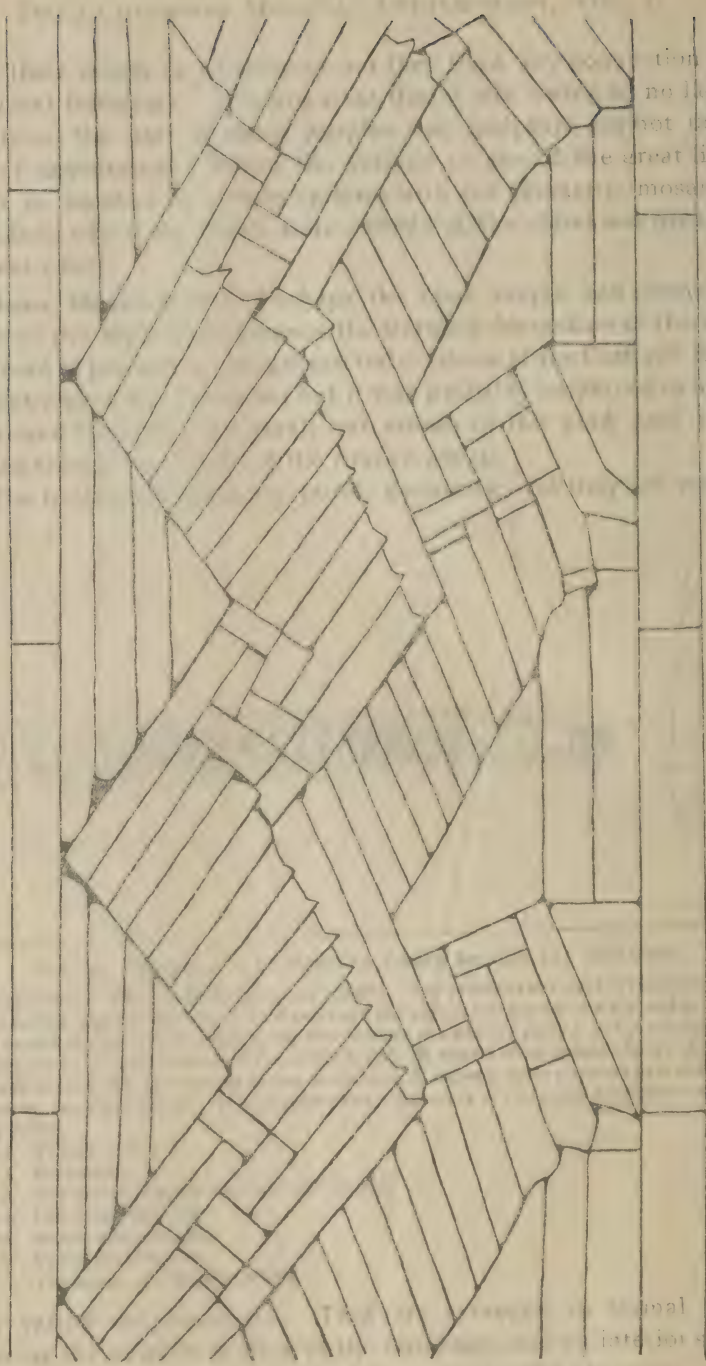
fully varied and attractive. They are arranged in formal panels, covering the exterior surface of the buildings, and on interior surfaces are in panels or in continuous bands encircling the chambers.



RELATION OF MOSAIC PATTERNS TO THE MOSAIC STONES.

Over-Sheet showing the separate stones of the mosaic.

RELATION OF MOSAIC PATTERNING TO THE MOSAIC STONES



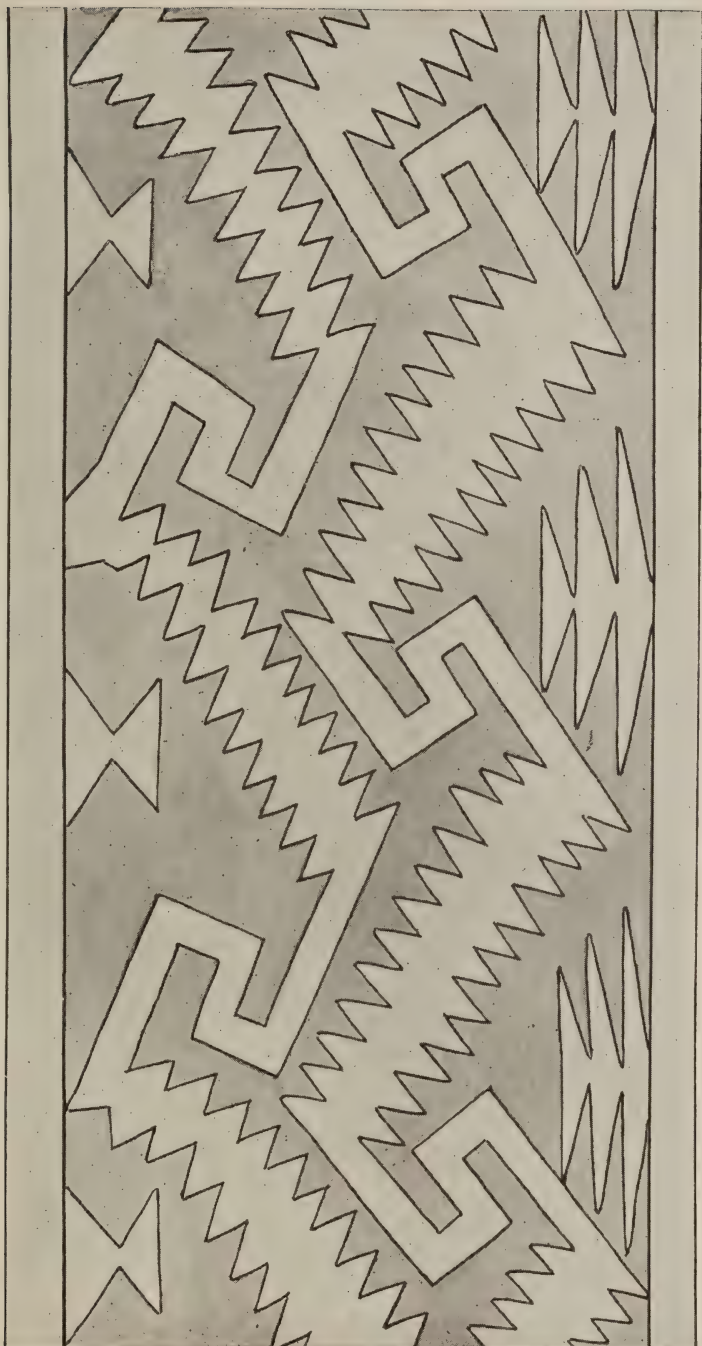
tion with
no lack of
not take a
e great intels
mosaics of
with

able
Establish-

lateral panels.
interior surfaces

LEFT COLUMN IN MUSEUM

ANTHROPOLOGY, PL. XXX-A



RELATION OF MOSAIC PATTERNS TO THE MOSAIC STONES.

Under-Sheet showing the relief patterns cut on faces of mosaic stones.

Before taking up the decorated panels in detail it will be necessary to consider the treatment of the walls as a whole, and to examine the remarkable masonry framework with which the panels are surrounded. It is not known to what extent the facings of the substructures were embellished, as all are almost wholly destroyed, but it is probable that some were of rough stonework plastered, while others were of hewn stone, varied more or less by moldings, offsettings and possibly by cofferings. The exterior walls of the better preserved buildings, as well as the façades overlooking the courts, were occupied by three ranges or lines of oblong, horizontal panels of mosaic fretwork. Below, between and above the horizontal rows of panels, there are certain courses of the facing that extend entirely around the building without break or deflection; while one course is deflected in such a way as to partially inclose the panels framing them in as illustrated in Fig. 83. It will be seen by reference to the drawing that the corner blocks, which form a most striking feature of the mural treatment, are merely undecorated panels filled out to give solidity to the angles of the building.

Much diversity in the effect was given by setting some lines of this framework in and others out—as shown in the profile—as well as by variations in proportions resulting from differences in length between the members of the various zones of panels. Variations are more marked in façades broken by doorways. Where there are triple openings the decorated lintel panel is very long and has over it a grand panel of mosaic, as seen in the façade of the Hall of the Six Columns, Pl. XXXI. In the faces of piers between doorways, short, narrow panels are framed in, and on short wall spaces—as in the ends of the buildings—single panels extend the full length of the wall surface. A study of the sections given in several figures will make clear the numerous eccentric features of profile, notable among which are variations in batter or pitch of the courses of stonework. The general effect of the profile, as seen at the corners of the buildings, is that of considerable inclination outward in ascending, but a plumb-line reduces this to a very few inches, the effect of overhanging being due largely to the decided inward pitch of the wide course of stones next the base. The exact nature of the finish at the top—the coping—cannot be determined, as one or more courses have been lost all around.

The geometric fretwork mosaics of the ruins must always stand as one of the most noteworthy features of our native architecture; yet the work differs from the mural treatment of Yucatan in subject matter rather than in kind, for the decorated surfaces there, though depicting

animal forms, are mosaics in the sense that they are made up of separate hewn or carved stones set in mortar to form ornamental designs.

In the Mitlan buildings there are about 150 panels of mosaic, aside from the continuous panels of the four grecque chambers of quadrangle D. The greatest width of panel is about 2 feet and the

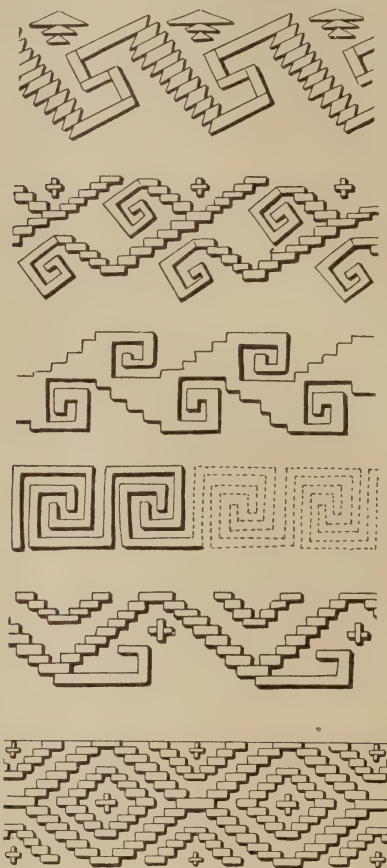


FIG. 84. MOSAIC PATTERNS—ANGULAR FORMS.

greatest length about 30 feet. The designers had only a limited number of motives to draw upon, but considerable taste was shown in the arrangement of these in various combinations to suit the spaces and to give diversity of effect. Alternation of motives was attended to, and although there is nowhere entire symmetry, care was taken that panels with like designs should be kept apart. Of the elements

employed I may mention the meander, mostly or always used as a stem for other more highly specialized elements; the diamond, always stepped and always pleasing in its diaper-like effects; the S-shaped curve connected by stepped or curved stems; and the curved or angular hook set upon angular stems in a great variety of ways. Each unit of the curved forms is necessarily cut to the curve while the angular forms are as a rule set up from small blocks. As it is impossible to convey a complete notion of these ornaments without illustrations, a number of the forms are assembled in Figs. 84 and 85. A somewhat

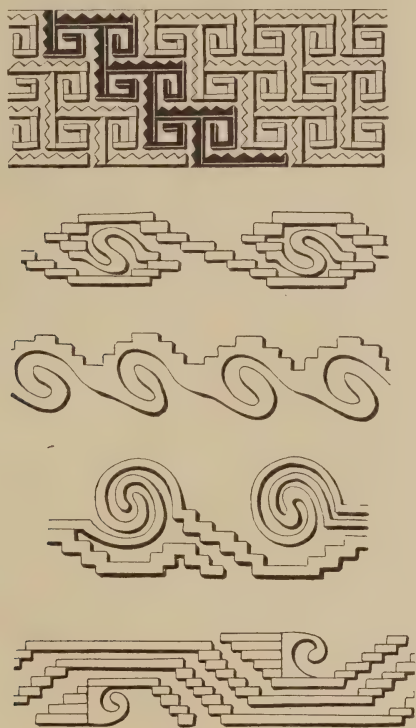


FIG. 85 MOSAIC PATTERNS—ANGULAR AND CURVED FORMS.

analogous use of similar geometric motives in mural embellishment is found in the "Hall of the Arabesques" at Gran Chimú, Peru, but it is to be noted that the same elements occur in the textile and ceramic arts of many of the more cultured American nations. Of course the stepped line so constantly recurring is a purely mechanical product resulting from the use of squared blocks in representing oblique lines. I have been unable to find any trace of graphic elements in these Mitlan

figures or the least suggestion that they were in any way significant. Of course it is not impossible that all the motives were symbolic and served to suggest to the builders some mythologic conception appropriate to the building or place. I have even been led to surmise, in view of the universality of symbolism in the native art, that possibly the decorated panels extending around the buildings represent the markings of the body of a serpent deity, and that the doorways with their teeth-like pillars stand for the mouth of the creature.

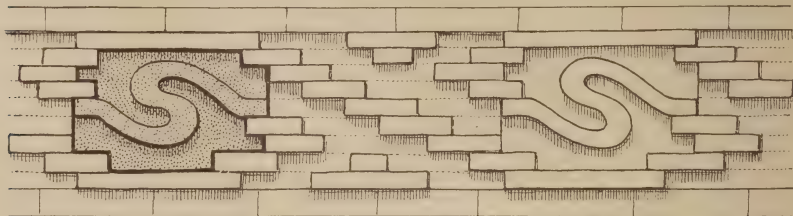


FIG. 86. INSERTION OF STONES WITH CURVED PORTIONS OF THE DESIGN CARVED UPON THEIR SURFACES.

The execution of this work is perhaps its most interesting feature. The panels in which the fretwork is set are all shallow, the framework rarely extending more than two or three inches forward from the face of the design, and the design is not relieved more than an inch and a half from its background. The bits of trachyte were cut into convenient sizes and shapes, and were deep enough to be set firmly in the plaster backing. The inserted ends are often tooth-like, and the tapering point or root is from one to six inches in length. It

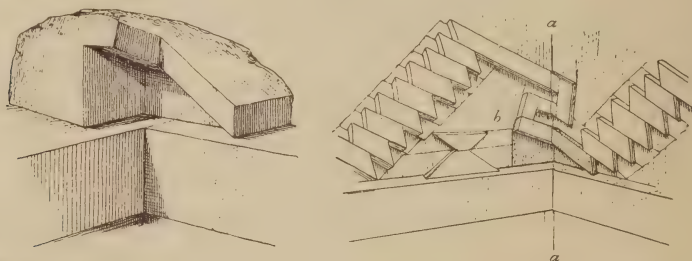


FIG. 87. STONES OF ECCENTRIC SHAPE USED WHERE DESIGNS TURN CORNERS OF CHAMBERS.

a, a. Corner of chamber.

b. Corner piece, shown on larger scale in figure at left.

is a noteworthy fact that the pieces of stone were not reduced to uniform shapes and sizes to be laid up as brickwork, but each individual stone was cut and fitted to its place in the design as the work went on.

This is especially noticeable in cases where a curved bit of design was to be inserted (Fig. 86). The S-shaped portion was carved in relief on a large piece, and this was fitted into place among its smaller neighbors by notching the edges. Another example is shown in Fig. 87 which illustrates the method of connecting the figures of the side and end of a chamber without joint at the corner. To show the rather haphazard fitting in of the stones employed in forming a line of fretwork I have prepared Pl. XXX, in which the discrepancies between the blocks of stone and the elements of the design are made apparent. The tissue sheet contains the diagram of the separate stones of the mosaic, and should be laid upon the sheet containing the design. The relation of the panels to the framework, the embedding of the tiles and other details are well shown in the section, Pl. XXXV. Several examples of the simpler dentate stones of the mosaic are outlined in Fig. 88. The number of these stones used—all care-

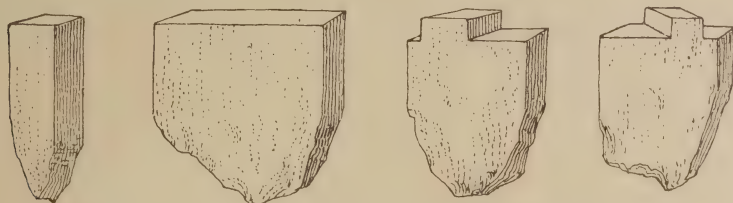


FIG. 88. FORMS OF ORDINARY DENTATE STONES USED IN MURAL MOSAICS.

fully cut and fitted—is very great. A single room in the Quadrangle of the Grecques contains over 13,000, and the whole cluster of buildings must have contained nearly ten times that number. These mosaic stones are made of fine grained trachyte, and—although the rock is rather soft—the amount of labor required to block them out and cut and dress their surfaces can hardly be justly estimated.

There is, and will for the present remain, a question as to the exact manner in which the surfaces of these small stones were finished. Possibly the green stone celts, found occasionally about the ruins, were used. Possibly the flint hammer-stones, occurring in great numbers, were employed, though pecking operations would be difficult where the bits of stone were never more than a few inches in their greatest dimensions. It may be that the surfaces were evened up and finished by grinding.

PLASTER, CEMENT. It is not known where the Mitlan builders obtained their lime, but it will probably be found that suitable limestone for burning outcrops somewhere in the valley. It does not appear that lime was much used in the construction of foundations

and walls of buildings, for the adobe mortar was well adapted to this purpose; but the cement employed in laying floors, and the plaster used in facing up walls, was of excellent quality. The best example of cement flooring is found in the South Side Group where the three terraces of the great pyramid have had floors of unusual solidity. The mass of the mound is composed of earth or adobe and irregular stones. The surface to be concreted was first leveled up with rubble cement, from 4 to 6 inches thick, and then upon this a surface layer of fine cement from 1 to 2 inches thick was laid. So tenacious are these floors that where the supporting mass has crumbled away, they stand out in places 2 or 3 feet from the sides of the mound, and slabs several feet in length, 4 or 5 feet in width and 7 or 8 inches thick, have descended to the base without breaking up. As there has been some post-Spanish occupation of these structures it is probably not quite safe to assign all remaining features to the ancients, but this cement work may, I believe, be justly attributed to them. The surfaces of floors and walls were usually well smoothed and often in parts polished.

PAINTING. The art of painting was extensively and tastefully practiced by the ancient builders. As a finish for architectural surfaces color was used everywhere, a thickish, pasty distemper of several hues having been applied to plain and decorated surfaces alike, to stonework as well as to plastered walls and cemented floors. The colors used were largely white and red, with all grades of paler tints made by mixing these colors in various proportions. Other colors are rarely seen. The painted surfaces about doors and passageways have been in many cases highly polished—no doubt by rubbing. It would seem a superfluity to paint the beautifully finished and jointed stonework, especially where it embodies relief work of complex design, but it is apparent that this was done, and nearly all the scores of grecque figured panels show traces of pale red tones, mostly laid over a priming of cream or white. The amount of work involved was very great, but these strange peoples were evidently not averse to labor. The origin of the colors is not known, but they were probably composed largely of lime or the natural earths of the vicinity mixed with iron oxides.

PAINTED DESIGNS. It seems also to have been a common practice to finish certain important surfaces, such as those of lintels and door jambs, in elaborate designs, not geometric in character as were the relief wall decorations, but consisting of life forms more or less conventionally treated. Good examples of this work are seen on the lintels of the northern or Catholic Establishment group, and on

those of the Arroyo group below. Slight traces of similar work are seen in other places. The surface of the stone, though reasonably smooth, was not used for the designs but a ground of light gray color was applied and polished, giving a hard, even surface easily drawn upon with the brush. The work in the two groups is much alike save in subject matter and in minor details of manipulation. All are painted on the recessed panels of the lower half of the lintel faces. A small portion of the design from the lintel on the north side of the court now used as a stable by the Catholic establishment is given in Fig. 89, and a like bit from the north lintel in the southern court of the Arroyo group is presented in Fig. 90. Although I made pretty careful

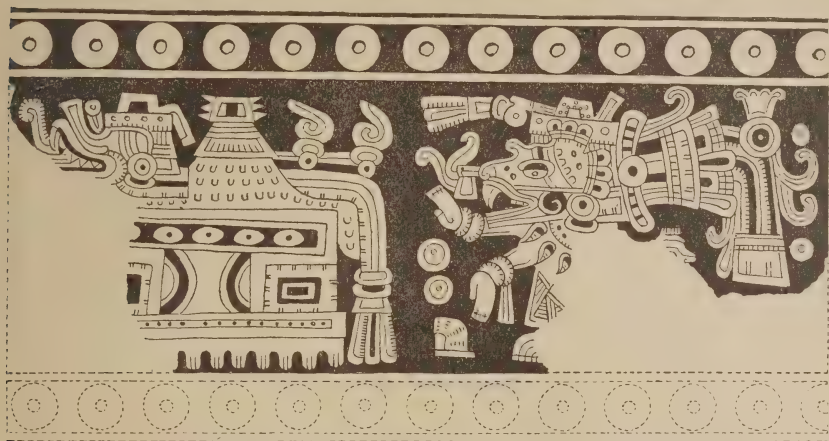


FIG. 89. SMALL SECTIONS OF PAINTED DESIGN FROM LINTEL IN THE CATHOLIC ESTABLISHMENT GROUP.

The outlines and background are in dark red, the design being left in the gray ground color.

drawings of these particular portions of the designs, because they seemed thoroughly representative, I found the copies published by Dr. Seler* more complete, showing portions now obliterated, and my illustrations are therefore traced from his work. Although the Seler reproductions are excellent and give a clear idea of the designs, they hardly do full justice to the originals, especially those of the northern group, which are executed with the greatest precision and neatness, the handling of the brush being that of a master. The space to be decorated was first coated with thick whitish-gray paint which was well polished down, then the elaborate design was worked out in dark red lines and further developed by painting in the background in dark red, thus leaving the figures glowing in the ground color. The draw-

* Seler, Dr. Eduard. *Wandmalereien von Mitla*, Berlin, 1895.

ings all show the remarkable mythologic subjects and peculiar style of convention characterizing certain of the ancient Mexican codices or books so well reproduced by Kingsborough. The fragment shown includes at the right a human figure wearing a strongly drawn grotesque animal mask, and at the left a house or temple with high peaked roof over which extends the body of a highly conventionalized serpent.

The paintings seen in the Arroyo group occupy the lintels of the southern quadrangle and are preserved only along the upper margin of the lintel recess where protected from the weather. The whole area in each of the lintels, some 30 feet long by 12 inches high, was prepared as in the other buildings by applying a coat of grayish color and giving it a high polish. The figures were then painted directly



FIG. 90. SMALL PORTION OF PAINTED DESIGN FROM A LINTEL PANEL IN THE ARROYO GROUP.

Lines in dark red on a pale gray ground.

on this in dark red lines with a free and rather careless hand. The execution seems somewhat inferior to that in the other group, but the designs are equally elaborate and interesting. At the left, in the fragment reproduced, Fig. 90, there is a calendar like figure, which connects with other partially preserved figures on all sides. Above is a border of lines and dots, interrupted by the calendar figure and at regular intervals by abbreviated figures facing downward. Below is a human figure, placed with the head toward the calendar device and facing downward. This personage rests on one knee and grasps portions of the complex devices with his left hand. The left foot is replaced by a unique device. Seler, the foremost scholar in this field of research, has dwelt upon the significance of these remarkable delineations, rendering discussion on my part quite superfluous.

The position of these interesting remnants is shown in Fig. 91, which is a sketch of what is left of the north façade of the south court of the Arroyo group.

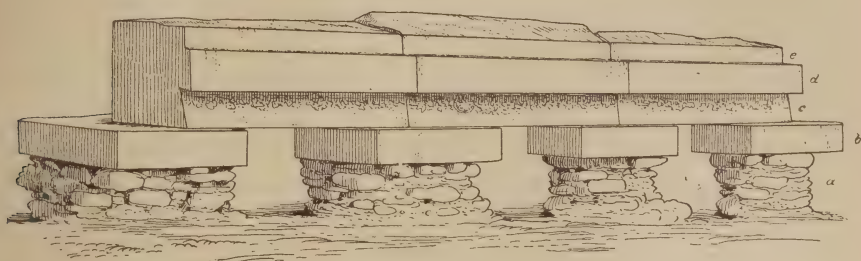


FIG. 91. SKETCH OF THE PAINTED LINTELS, ARROYO GROUP.

The painted figures occupy the surface marked *c*. Full length of lintel about 30 feet.

Not the least remarkable thing about these paintings is that they have stood exposed to the open air and largely to the full force of the elements, without loss of surface or freshness of tint, for a long period of years. The only protection was afforded by the slight projection of the upper part of the lintel (*a*).

GROUP OF THE CATHOLIC ESTABLISHMENT. This group of buildings is seen at the right in the panorama and is long, low and monotonous in appearance. It is seen also in the distance in Pl. XXXIII. The ground plan cannot be fully made out on account of the destruction of portions of the walls and the covering up of other portions by the Catholic establishment, but it undoubtedly includes three coalescent or closely associated quadrangles of medium size, each being represented by its squarish court and such of the inclosing structures as have not been destroyed. The ground plan given on the accompanying map is too small to show details clearly, but is as accurate as could be made without better facilities for examination than are now afforded. The roofs have wholly disappeared save perhaps a small portion covering in the narrow passageway that gives admission to the northern court.

The walls of the buildings are generally between 3 and 4 feet thick; they are rarely much more than 12 feet in height and there is nowhere any sign of a second story. The interior or body of the walls is built of rough stone, laid often with considerable regularity in coarse adobe mortar. The surfaces are, or were, faced with blocks of cut stone or were finished in plaster. The exterior walls, and also those facing the courts, were handsomely finished with panels of fret-work in relief framed in with courses of hewn stone. The doors are

all large and the jambs, lintels and pillar caps are usually of handsomely cut stones of large size.

The north quadrangle (A on the map and in the panorama) has a court about 52 feet square, now used as a stable. The inner walls of the four buildings inclosing the court coalesce at the corners, and still stand to nearly their full height; but the outer walls of the east, north and west structures are almost obliterated. The building on the north was entered from the court by three fine doorways, and those of the east and west by one door each; all are closed by masonry and partially buried in debris. The south building, which adjoins and has one wall in common with the north building of the middle quadrangle, is entered by a single door and has been so much remodeled for stabling purposes that I am not sure of the correctness of the plan as given, particularly at the west end.

The court of this north quadrangle was entered from the north hall or building of the middle quadrangle by a narrow, crooked and dark passage in the same manner as were the northern courts of the two other triple groups of quadrangles, (see ground plans). For convenience of stable use doorways have been cut directly through the walls of the two chambers separating the north and middle courts. The walls of this court are finished in handsome panels of fretwork, but the most notable features are the painted lintels over the doorways of the north and east walls. The lower half of the lintel surfaces, protected by the projecting upper part, still retains considerable portions of the skillfully painted designs already described in some detail and illustrated in Fig. 89.

The middle quadrangle (B) is occupied as a curacy and is apparently wanting in a south building, the court, which is about 60 feet square, being inclosed on that side by the back wall of the north building of the adjoining south cluster. The northeast corner of the latter building is separated from the southwest corner of the east building of quadrangle (B) by a space some two feet wide. This is now closed by a modern wall, but appears to have afforded a means of entrance to the middle and thus also, through the dark passageway, to the north quadrangle. As none of the buildings have doorways exterior to the quadrangle, admittance into the courts must have been obtained by some such opening as this. The construction of the corresponding features on the west side is obscured by changes made in preparing the rooms for residence. As seen in the panorama this middle quadrangle is now entered by a modern doorway on the east side, in front of which stand two round columns forming with the wooden roof a kind of portico. The columns were probably obtained

from one of the halls of the Group of the Columns below, as none of the chambers in the northern group appear to be wide enough to have made the use of columns necessary as roof supports. The exterior eastern walls and the walls facing the court have the usual panels of mosaic.

The Quadrangle of the Church (C) forming the south member of the group, is represented by portions of the east and south buildings, well shown in the panorama, and by the northern member. The west building, if such ever existed, has been destroyed or built into the walls of the church. The length of the east building is 88 feet on the exterior, and it is therefore probable that the court, now occupied by the church, was upwards of 80 feet square. The lintels of the doorways opening from this building into the court are barely visible above the mass of rubbish.

GROUP OF THE COLUMNS. In the immediate foreground of the panorama we look down upon the Group of the Columns. Its well-preserved buildings are the pride of Mitla and are among the most unique and remarkable of the many architectural remains of Mexico. This group, like the northern one, is composed of three quadrangles and, theoretically, at least, of twelve buildings or their representatives. Two of the quadrangles are large and one is small. The middle one I shall call the Quadrangle of the Columns (E); the southern, the Quadrangle of the Subterranean Galleries (F), and the northern the Quadrangle of the Grecques (D). The latter does not stand alone, but is coalescent with the Hall of the Six Columns—the north building of the middle quadrangle (E); and the four structures are joined in such a way that they become so many chambers of a single structure inclosing a court.

I will not attempt to present a fully detailed analysis of the many interesting features of this group of quadrangles, but content myself with a descriptive sketch of each quadrangle and the presentation of several sections and drawings illustrating points in construction.

QUADRANGLE OF THE COLUMNS. A glance at the accompanying map will show the relations of this quadrangle to its associated quadrangles on the north and south. Its court (E), a shallow dish-like area about 150 feet from east to west and a little less from north to south, is bordered by the well-preserved Hall of the Six Columns (16) on the north and the three ruined structures (17, 18, 19) on the other sides. Originally the court was probably nearly or quite level; it was inclosed by the four steep faces of the platforms supporting the buildings, and these platforms were joined or but little separated at the corners and finished, no doubt, with hewn stone. It is reason-

able to suppose that broad stairways of cut stone led up to the buildings from the court, and possibly in the middle of the space there was a shrine or small structure of some kind, as in very many similar courts in the Oaxacan province. There are now, however, no traces of these features, and the only thing left to relieve the smooth surface of the court is a broken, half-buried column near the west side, where it has rolled down probably from the east building.

The east building (17), which appears in the immediate foreground of the panorama, is so well preserved that its character and dimensions can be accurately determined. The terrace or platform is about 6 feet high at the north end, and 10 or 12 feet high at the south end. It is much broken down about the margins, and is not far from 120 feet long and 30 feet wide at the top. The building probably fell a little short of these dimensions. Remnants of the walls stand toward the south end to the height of 10 feet, but the facing is all gone, leaving the rough masonry wall or hearting exposed and tottering. The middle opening of the triple doorway, rendered stable by its heavy piers and massive though shattered lintel, is still standing. At the north end, where the walls are entirely removed, the margins of the cement floor, which was polished and painted red, outcrop from the heap of debris. The chamber was upwards of 20 feet wide, and its roof was supported along the middle by a line of five columns, two of which still stand. The others have been removed; one lies in the court, and two form pillars for a porch to the curate's residence, as already described. Some writer has stated that still another column stands in front of a building in south Mitla, but I was not able to confirm this.

The west building, now represented by an oblong, mound-like mass, was evidently nearly identical with that on the east. The cement floor is still preserved to nearly its full dimensions, and upon this are piled up portions of the debris of the superstructure. A careful examination of the floor surface would show us whether or not columns were formerly planted along the middle, but from the very considerable width of the floor, which, unfortunately, I failed to measure, it seems that columns may have been required for the support of the roof.

The south structure is in a still more advanced state of ruin, and is divided near the middle by a depression, possibly of recent excavation, through which access is gained to the court. The original walls of the terrace, minus the cut stone facing which probably covered them, are preserved at the east and west ends, and partly on the south, to nearly the full height. There is no reason to doubt that

The view is made up of three photographs taken from as many points near
 the southern margin of the court. The negatives vary slightly in scale, and the
 continuity of horizontal lines is interfered with as seen in the lower course of
 masonry, though the defect has been partially remedied by retouching. The full
 length of the building is 133 feet and the height in places is upwards of 14 feet.
 The full height was probably not far from 16 feet, as two or three courses of the
 coping stones must have been removed. The stairway and the low, narrow
 esplanade that extended along the front are nearly obliterated or are obscured by
 accumulations of debris. A breach in the wall at the right has been repaired by
 the authorities, giving it the appearance of a window opening. The columns
 within are so placed that they are not visible through either of the doorways, but
 the wall niche and part of the opening into the passageway that leads to the
 north court are seen.

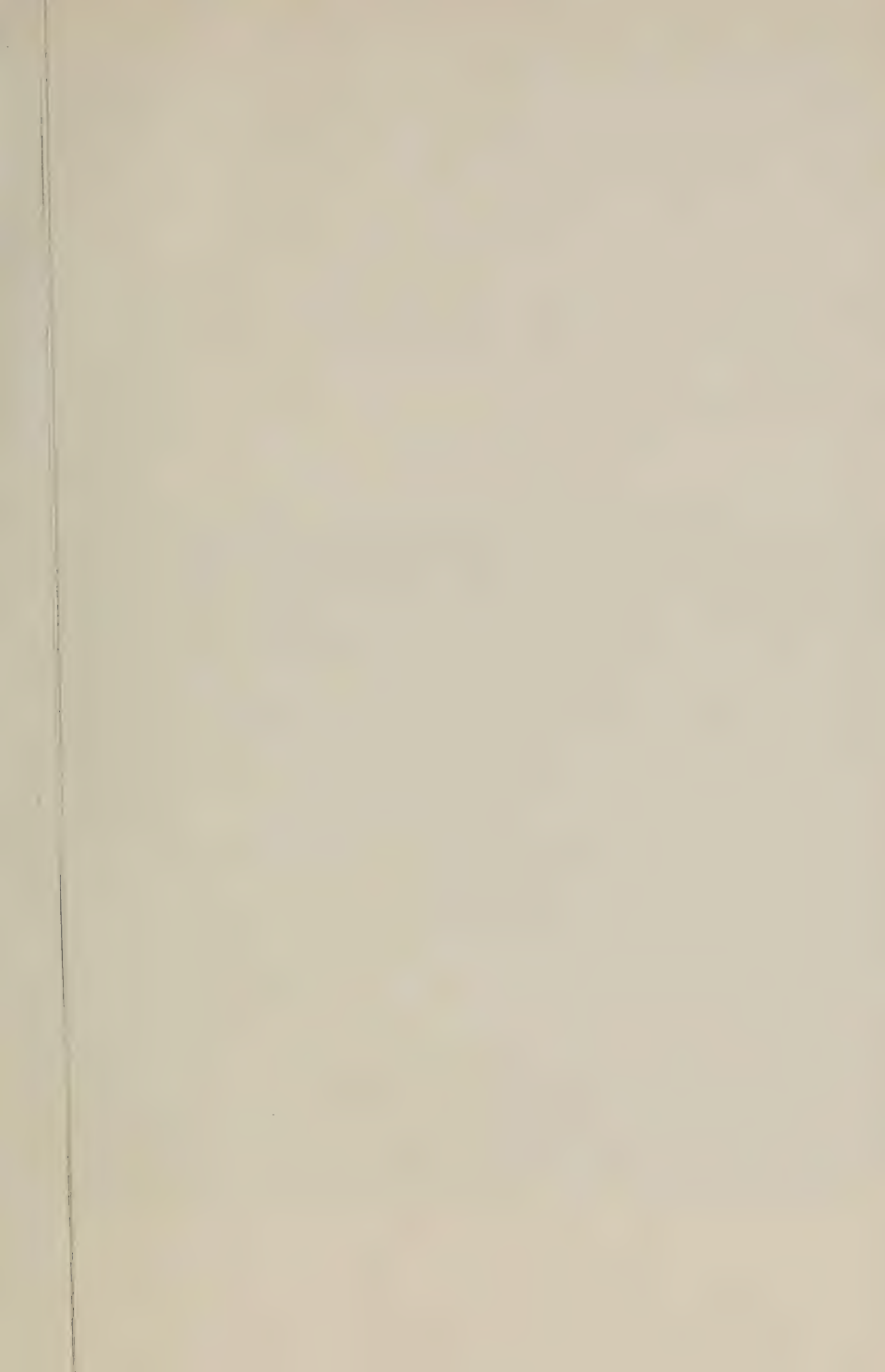
PL. XXXI. FACADE OF HALL OF SIX COLUMNS.

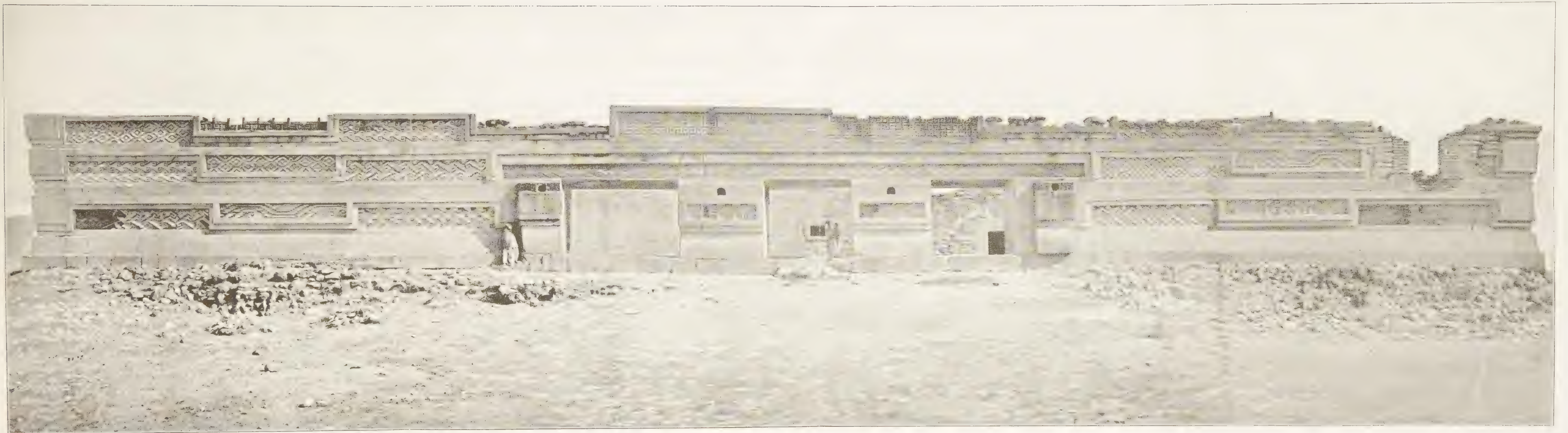
This view is made up of three photographs taken from as many points near
 the southern margin of the court. The negatives vary slightly in scale, and the
 continuity of horizontal lines is interfered with as seen in the lower course of
 masonry, though the defect has been partially remedied by retouching. The full
 length of the building is 133 feet and the height in places is upwards of 14 feet.
 The full height was probably not far from 16 feet, as two or three courses of the
 coping stones must have been removed. The stairway and the low, narrow
 esplanade that extended along the front are nearly obliterated or are obscured by
 accumulations of debris. A breach in the wall at the right has been repaired by
 the authorities, giving it the appearance of a window opening. The columns
 within are so placed that they are not visible through either of the doorways, but
 the wall niche and part of the opening into the passageway that leads to the
 north court are seen.

Photograph by E. H. Thompson.

THE FOLLOWING FOLDING PLATE
HAS BEEN FILMED IN 4 SECTIONS
IN THE SEQUENCE SHOWN

	Title			
1	2	3	4	





FACADE OF HALL OF THE SIX COLUMNS

this terrace was closely similar to the others and supported a similar building, though there is nothing to show whether it was of double or single width. It is highly probable that in form, finish and decoration the east, west and south buildings were very similar to the north building, described in the succeeding paragraphs.

HALL OF THE SIX COLUMNS. Facing the court E on the north is one of the best preserved of the Mitlan buildings. It is of the usual oblong shape and contains but a single chamber, while back of it to the north and connecting with it is the closed Quadrangle of the Grecques, D. We have thus a compound structure which is usually regarded as a single building; but for the sake of clearness of description, I shall treat it as consisting of the five buildings which it theoretically embodies—the north building of the middle quadrangle and the four buildings of the north quadrangle. The platform occupied by this composite structure is a single mass composed of the usual rubble, and is hardly more than 6 or 7 feet in height at any point. The upper surface projects 4 or 5 feet beyond the walls of the superstructure, forming a narrow esplanade. This space had a cement floor, fragments of which are preserved in protected spots, and I observed that the nearly vertical front of the terrace has been faced with cut stone, portions of the lower course being still in place.

The superstructure is seen to good advantage in the panorama. The walls are preserved nearly to their full height all around, but the roof has entirely disappeared as well as one or more courses of coping stones. The three zones of mosaic panels can be followed entirely around the building save where interfered with by the doorways. In the panorama we look along the south front which faces the court and observe that its three squarish doorways give entrance to a long hall in which the tops of six columns are seen. The interior view is more effectively presented in the photograph reproduced in Pl. XXXII, which was taken from the top of the wall at the east end of the hall.

The grand though low and somewhat monotonous façade is shown in Pl. XXXI, which is made up of three views taken by Mr. Thompson from as many points of view within the court and joined to form one view. The photographs are not as brilliant as could be desired, and do not join with exactness, but the view will be useful to the student who wishes to study the various features in detail. This façade is 133 feet long and 14 feet in height; it is rendered especially noteworthy by its three fine doorways with their great sculptured lintels and massive piers, by twenty-three panels of handsome mosaic

fretwork, and by four deep pittings drilled in the pillar caps at the sides of the doorway and supposed to have served for supporting the timbers of an awning. Facing the observer in the panorama (Pl. XXXVIII) we have the east end of this structure; its three long grecque panels are broken down through the middle, but I have filled them out in order that a better idea of the building may be given. The opposite end is complete and is identical in every way. On the right, and set back some thirty feet, is the east wall of the annexed quadrangle (D) with its nine panels. The corresponding walls on the west side duplicate these, and the three sections of wall facing north have also nine panels each. There are, therefore, fifty-three exterior panels of fretwork in this entire structure or cluster of buildings. It is observed that the top courses of the walls are for the most part missing, and the facing stones along the base of the walls and most of the facing of the supporting terrace have been removed by modern house-builders.

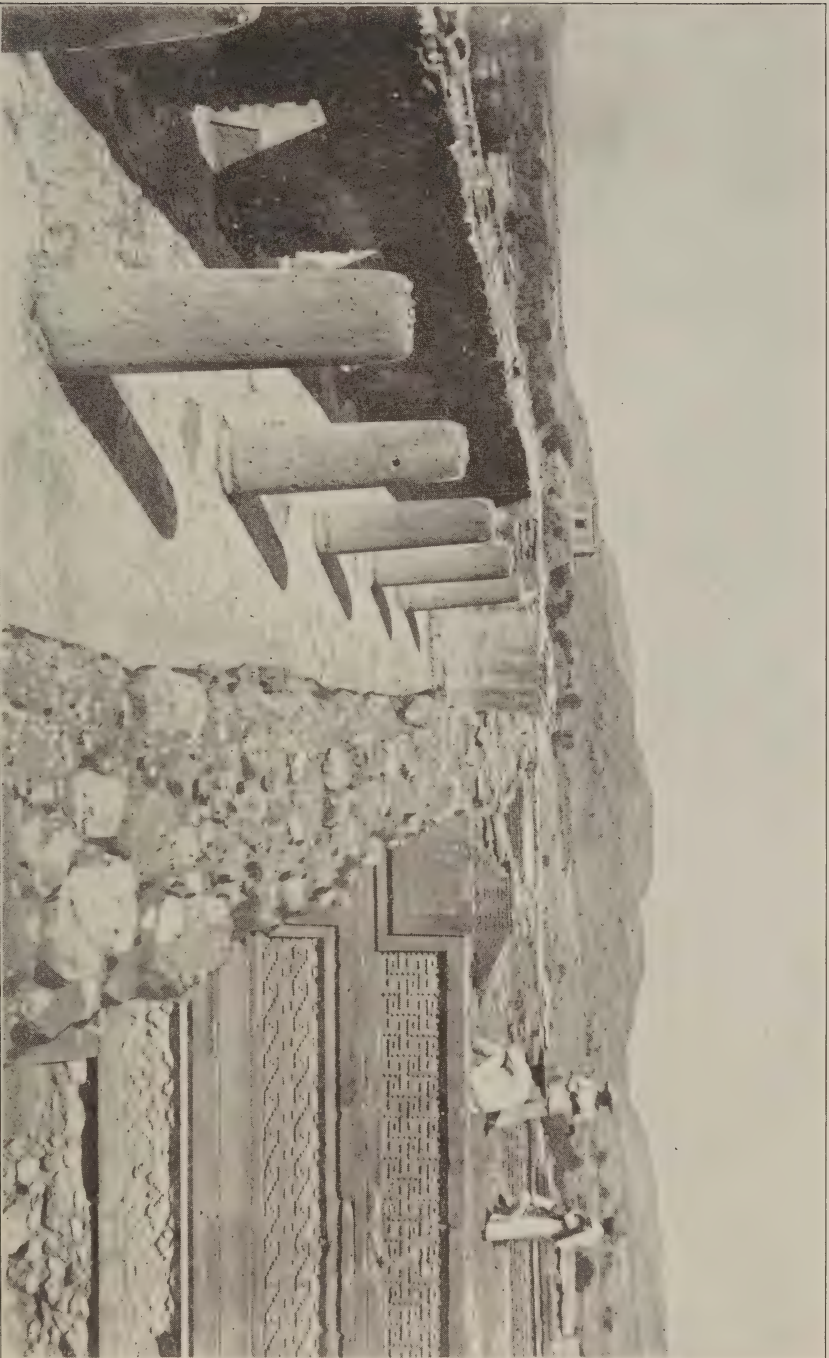
Entering the Hall of the Six Columns from the court (E) we observe the monotonous interior walls broken only by the three front doorways, by a smaller back doorway leading to the north court, and a recess or niche 17 inches high, 30 inches wide and 23 inches deep, placed in the center of the north wall opposite the entrance. It should be mentioned that the Mexican authorities some years ago, finding these walls much weathered out and liable to fall, undertook to repair them. As flattish red brick were employed—in the main at least—in this work the visitor need not be deceived as to the parts thus tampered with. As to the plaster of the walls and floor, it is somewhat difficult to say just what part is original and what is restored; but there seems to be little doubt (unless the entire wall surface has been replastered) that the walls were plastered originally and not finished in mosaic panels as in the chambers of the annexed closed quadrangle. The present appearance of the floor and walls is shown in Pl. XXXII. The great feature of this fine hall, which is 23 feet wide and 125 feet long, is the row of six columns arranged symmetrically along the middle. These columns are very well preserved and uniform in height and position. They are about 3 feet in diameter near the base, tapering a little toward the top, and vary but a few inches from 11 feet in height. They must be deeply planted in the substructure, as indicated in the section, Fig. 92, and their office was undoubtedly that of supporting the roof. Their height is about such as to permit of the use of longitudinal timbers, after the manner shown in the figure. Possibly there may have been capstones, as suggested in the auxiliary figure at *a*, but the only column in Mitla still supporting its original burden

PL. XXXII. INTERIOR OF HALL OF THE SIX COLUMNS, FROM ABOVE.

This view looks west from the northeast corner of the wall and shows the columns planted along the middle of the floor, the front wall in shadow at the left with the doorways indistinctly displayed, the north wall in the center of the picture, and the annexed quadrangle at the right. Of the latter structure we see part of the east wall (exterior), with its grecque-panels; we also get glimpses into the court at the right of the figures in white, and into the south and west grecque chambers at the left of these figures.

In the middle distance is the small church surmounting the principal pyramid of the Adobe Group, and in the distance, near the middle of the picture, the Fortified Hill.

Views of modern Mitla (obscured by foliage), and of the valley of the Rio Mitla are obtained at the left. Height of columns, 11 feet; width of hall, 23 feet. Photograph by A. V. Armour.



INTERIOR OF HALL OF THE SIX COLUMNS, FROM ABOVE.

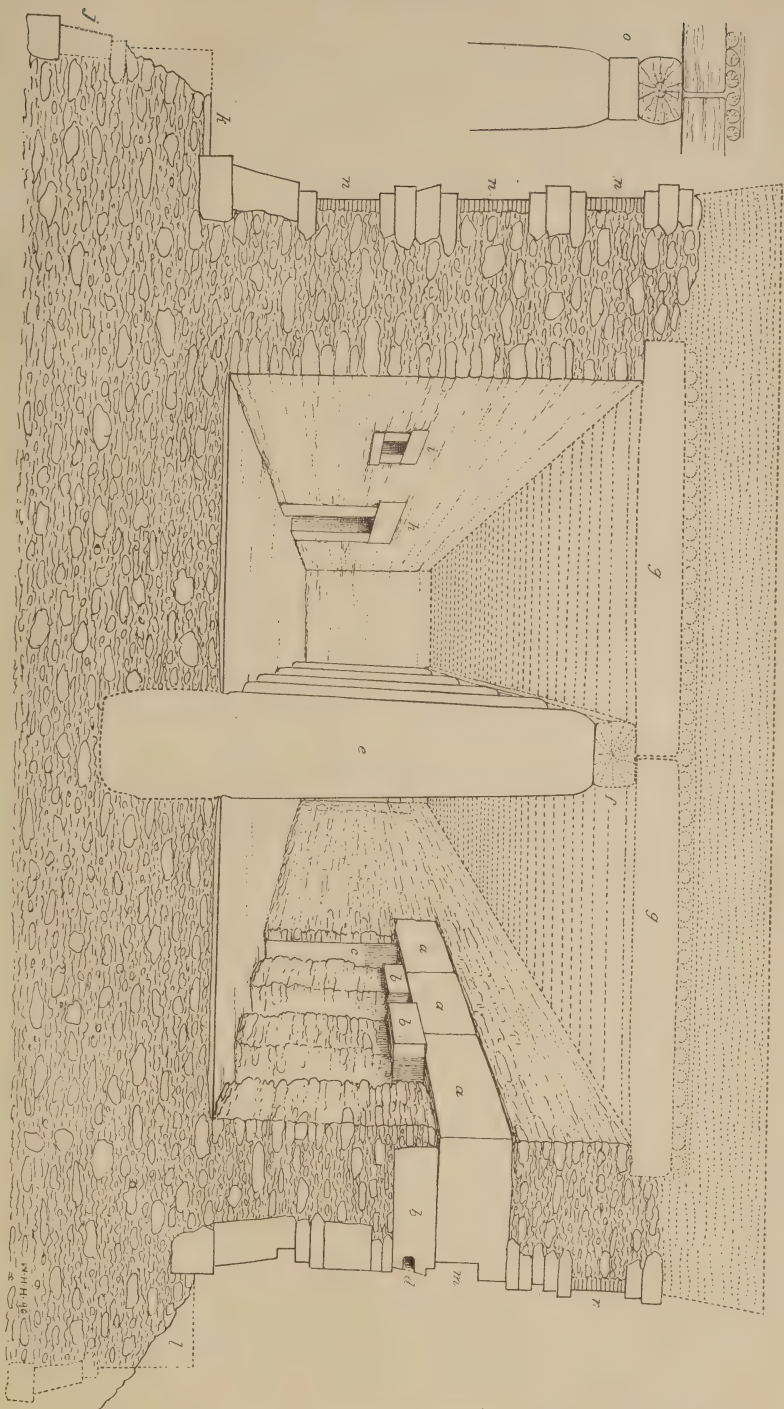


FIG. 92. SECTION AND PERSPECTIVE OF THE HALL OF THE SIX COLUMNS; LOOKING EAST.

Width of chamber, 23 feet.

- a, a, a.* Lintels of triple doorway.
- b, b, b.* Capstones of piers and jambs.
- c.* Jambs, falling short of thickness of wall.
- d.* Socket for awning or roof timber.
- e.* Column, 11 feet 2 inches high (from floor).

- f.* Longitudinal beam (restored).
- g, g.* Cross beams (restored).
- h.* Entrance to passage leading to north court.
- i.* Wall-niche.

- j.* Partial restoration of terrace facing.
- k, l.* Esplanade.
- m.* Decorated lintel space.
- n, n, n.* Mosaic panels.
- o.* Indicating possible use of capstone.

is without this feature. That wood ceiling beams were used in this group of buildings is clearly proved by traces left in the northwest corner of the associated quadrangle and referred to farther on.

Details of the inner facings of the front doorways, of the niche and the rear door leading to the northern court, are shown in Fig. 92. The great lintels are somewhat rough on the inside, and were probably faced with plaster. The eastern jamb of the east opening and the western jamb of the west opening of the doorway were each faced with a thick slab or block of stone, the eastern one only remaining. The two piers have large capstones, but only one of these extends through to the inner face of the wall. The piers are otherwise composed of ordinary masonry and the surfaces were faced up with plaster. Within the doorways, portions of the polished and painted surfaces still remain and in the better protected parts slight traces of painted figures are seen. The niche in the back wall is framed in with cut stones, and the entrance to the passage into the north court is treated in like manner.

QUADRANGLE OF THE GRECQUES. The northern annex of the Hall of the Columns is a consolidated quadrangle with its court and four buildings; the latter take the character of chambers, but at the same time retain the usual relation of buildings to the court. These chambers are entered by doorways which in this case are single instead of

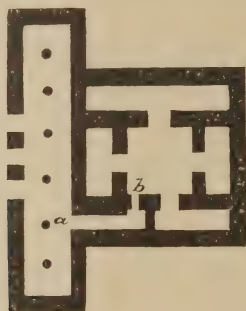


FIG. 93. SKETCH PLAN OF HALL OF SIX COLUMNS AND THE ANNEXED CONSOLIDATED QUADRANGLE OF THE GRECQUES.

a-b. Passageway from Hall of Columns to Court of Grecques.

triple—a result, no doubt, of the limited space available. The ground plan shows considerable lack of symmetry resulting from crowding together of the four buildings and the introduction of the long, narrow passageway connecting the Hall of the Columns with the court, (Fig. 93). A study of this plan in connection with the section given in Fig. 94 will, I believe, afford a correct notion of the

PL. XXXIII. COURT AND EAST CHAMBER OF THE QUADRANGLE OF THE GRECQUES.

In this view we are looking north from the roof of the narrow entranceway. At the left is a glimpse into the court with the doorway into the north chamber showing recent masonry jambs, and at the right very much in shadow is the east chamber. An excellent idea is obtained of the thickness of the walls, and the shape of the coping stones. The chamber is 6 feet 6 inches wide and the walls are but little less than this in thickness.

Beyond is the group of the Church Establishment, with the modern church rising out of the half demolished ruins. Behind this group we see the low, bush dotted trachyte bluff, and in the distance the great ridge bordering the valley on the north. Photograph by A. V. Armour.



COURT AND EAST CHAMBER OF THE QUADRANGLE OF THE GREQUES. CHURCH ESTABLISHMENT GROUP IN DISTANCE.

character and construction of this peculiar entranceway. The exterior appearance of the opening from the Hall of the Columns is shown in Fig. 92. Entering this portal, which is 3 feet 6 inches wide and 5 feet 6 inches high, we follow a passage of like

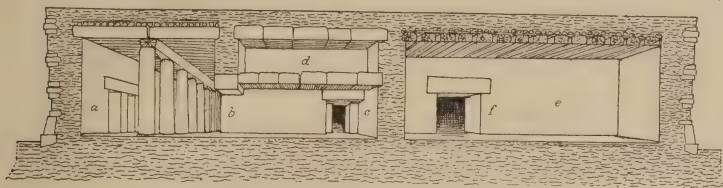


FIG. 94. SECTION AND PERSPECTIVE OF THE COMPOSITE GROUP. USUALLY CALLED PALACE NO. 1; LOOKING WEST. ROOF RESTORED.

- a.* Hall of the Six Columns.
- b, c.* Passageway from Hall of Columns to Grecque Courts.
- c.* Entrance to Grecque Court.
- d.* Supposed space over passageway; ceiling construction theoretic.
- e.* East grecque chamber with doorway into Grecque Court.

dimensions (save that it is a few inches higher) 23 feet 10 inches long to the south wall (*c*) of the east chamber of the annexed quadrangle, where we turn to the left and pass through a portal 3 feet wide and 5 feet 4 inches high into the court of the grecques at its southeast corner. The section cuts this passage from north to south and shows its construction and the interior conformation of the opening into the court. The ceiling is 16 or 18 inches higher than the lintels of the doorways, and the jambs and lintels as well as the ceiling stones are massive and well hewn. The walls are plastered and painted, and in some parts retain traces of the dark red, highly polished surface. I was unable to determine absolutely whether or not there is a hollow space (*d*) above this passageway, but my impression is that such a space exists. I observed that the roof surface showed traces of recent repair by the authorities, and portions of newly introduced timbers were visible. In Pl. XXXII the three figures of natives occupy this portion of the roof, and the right-hand figure is directly over the elbow in the passage. In Pl. XXXIII we have a glimpse into the east chamber with its grecque covered walls and into the court at the left. The group of the Catholic Establishment is seen in the distance in this plate. The panorama gives a more connected though less interesting view of most of these features.

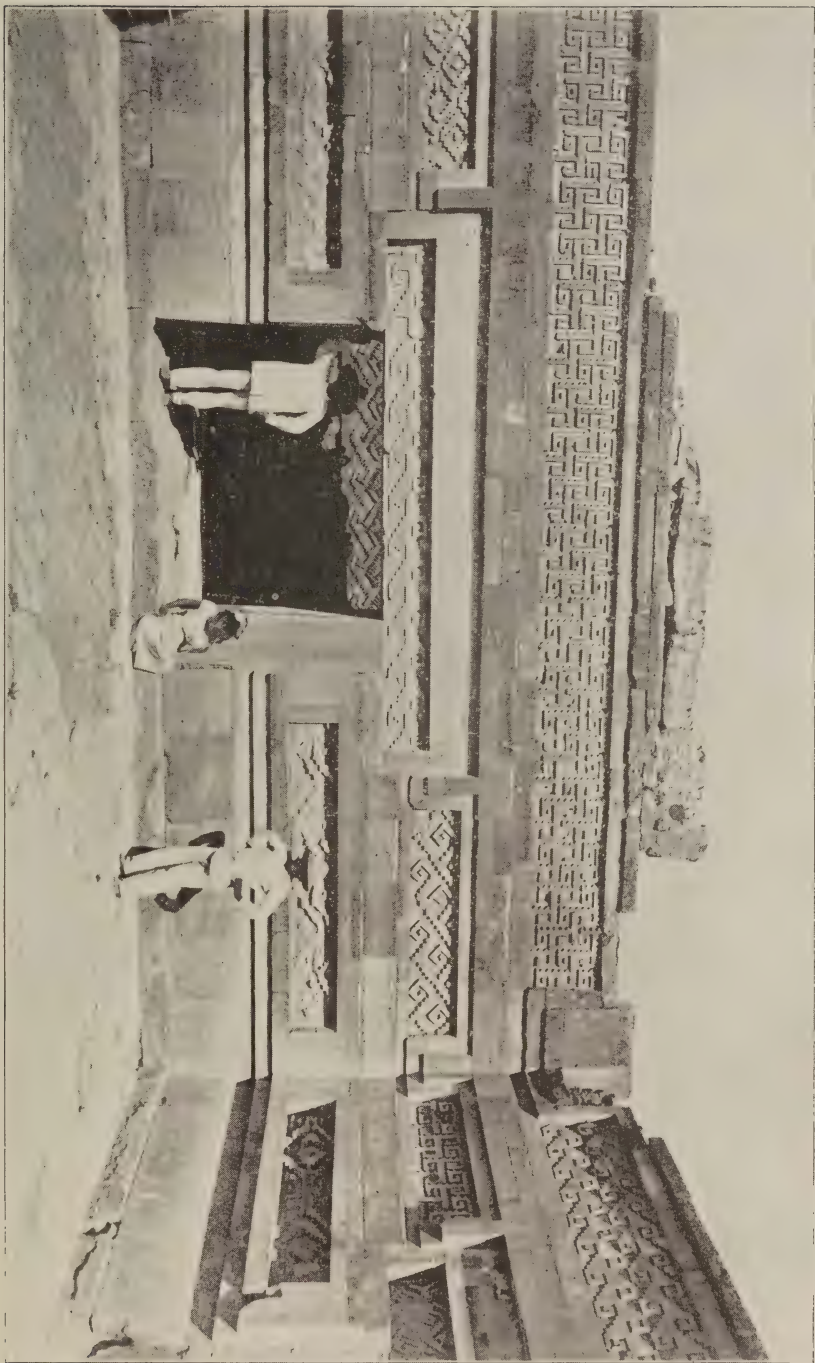
The court of this quadrangle is about 30 feet square, and the walls are well preserved to a height varying from 12 to 14 feet. There are five doorways, four opening into the four halls of the quadrangle, the fifth leading into the entrance passage just described.

The floor is cemented and shows no traces of the former presence of any architectural features. The walls are richly ornamented with fretwork panels framed in with courses of cut stone set now forward, now back, forming tasteful effects. There are eight panels on the lower line at the sides of the doorways, the southern one on the east side—interfered with by the entrance doorway—being shorter than the others. There are eight panels above on a line with the lintels, and four grand panels at the top extend each nearly the entire length of the wall occupied. The great lintels have each a narrow recess cut into the lower half of the face extending nearly the full length; these recesses are decorated with sculptured grecques which repeat the mosaic patterns of the walls. The lintel over the west doorway (see Pl. XXXIV) is 12 feet 6 inches long, 30 inches high and 36 inches wide, and the others have closely corresponding dimensions. All the door jambs but one have been removed or destroyed, and pillars of masonry have been inserted in some cases by government order to keep the cracked lintels from falling (see Pl. XXXIII). The remaining jamb-stone, against which the child sits in Pl. XXXIV, is a finely cut slab 5 feet 4 inches high (the height of the door), 3 feet $7\frac{1}{2}$ inches wide (the depth or distance through the door), and $16\frac{1}{2}$ inches thick.

The four rooms to which these four doorways give entrance are marvels in their way, the walls being faced—save a plastered dado 4 feet 6 inches wide—with solid mosaic, consisting of the most perfect and charming fretwork. The section (Pl. XXXV) gives a good idea of the construction of the walls which separate the court from the side halls and indicates the vertical extent of the panels of fretwork. Details of the construction of the mosaic are given in another place. We gain some idea of the amount of work involved in decorating one of these rooms by computing the total number of pieces of hewn stone employed. In the west chamber, for example, this number (only an approximation, of course) I find to be 14,690. The other rooms are smaller, and would average perhaps 8,000 each. The twenty panels of the same work in the court and the fifty-three panels of the exterior walls of the structure—seventy-three in all and estimated to require 600 stones each—would aggregate 43,800 pieces. We would thus have in this quadrangle a total of 81,800 mosaic stones, many of which are of complex and varied shape. If the Hall of the Six Columns was finished originally as were the rooms of the north quadrangle, the whole number of mosaic stones in this cluster of chambers would certainly exceed 100,000; and if we were to add to this number all that would be required in the remainder of the group, and in the

PL. XXXIV. IN THE COURT OF THE QUADRANGLE OF THE GRECQUES.

We see here portions of the west and north walls facing the court, and get an excellent idea of the long grecque-panels over the doorways, and the smaller panels below. A small portion of the farther jamb of the north doorway is seen at the right, and the fine doorway giving entrance to the west hall appears at the left. The great lintel is well shown, with its smooth surface above and the sculptured grecque-panel below. At the right, behind the figure of the child, is the only remaining jamb-stone. Surmounting the wall over the doorway is a remnant of the concrete coping with a roundish opening at the right which has caused no little speculation as to its use. The width of the doorway as it stands is 6 feet. Photograph by A. V. Armour.



IN THE COURT OF THE QUADRANGLE OF THE GRECQUES.

three great groups which are so much like this one in their general style—supposing all to have been similarly decorated—the grand total would hardly fall short of a million.

The west chamber of the grecques is the best example of the Mitlan interior, and in Pl. XXXV I have undertaken to present a complete idea of its appearance and of the construction of its walls and roof. Taking the excellent view made by Mr. Thompson, which looks north from near the south end, I have framed it in with a section showing every detail of construction. The floor is neatly cemented though now not quite level. The dado is of masonry formerly smooth-finished in plaster, the surface remaining in some parts. Above are the three bands of geometric mosaic, bordered at the top and bottom by narrow courses of hewn stone; the manner of inserting the

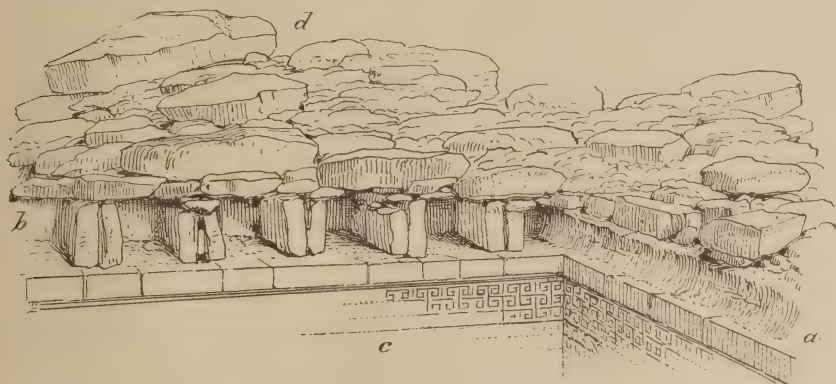


FIG. 95. DRAWING SHOWING BED AND SOCKETS OF CEILING BEAMS.

- a. Imprint of rounded surface of log in mortar bed.
- b. Line of sockets from which beams have been removed.
- c. Interior wall of grecque chamber.
- d. Loose stones of top of wall.

various parts is shown in the section. The doorway opens into the court in the middle of the wall at the right; above it is the massive lintel with the flat grecque sculptured face next the chamber, and the notched front, also grecque sculptured, facing the court; the section appears at *d*. Across the top a single ceiling timber is introduced and the roof construction is suggested in broken lines. The warrant for this manner of inserting the beam is found at the north end of the chamber where the interior wall surface retains its full original height and the bed of the end beam is still plainly visible. The rounded side of the log has left its imprint in the mortar across the end of the chamber and the sockets where the ends were inserted appear at the right and left. I have prepared two drawings (Figs. 95 and 96) to

further illustrate this phase of the construction. In Fig. 95 we see at the right the imprint of the end beam and the socket into which the farther end was fitted, while other sockets appear at the left extending to *b*. The beams were laid across from wall to wall as indicated more clearly by the dotted lines in Fig. 96, *g, h, i*; they were about 10 feet long, 12 inches wide and 8 or 9 inches thick and were separated by spaces of 6 or 8 inches. These spaces were filled in at the ends by stones set on edge, as indicated in perspective in Fig. 95 and in plan in Fig. 96.

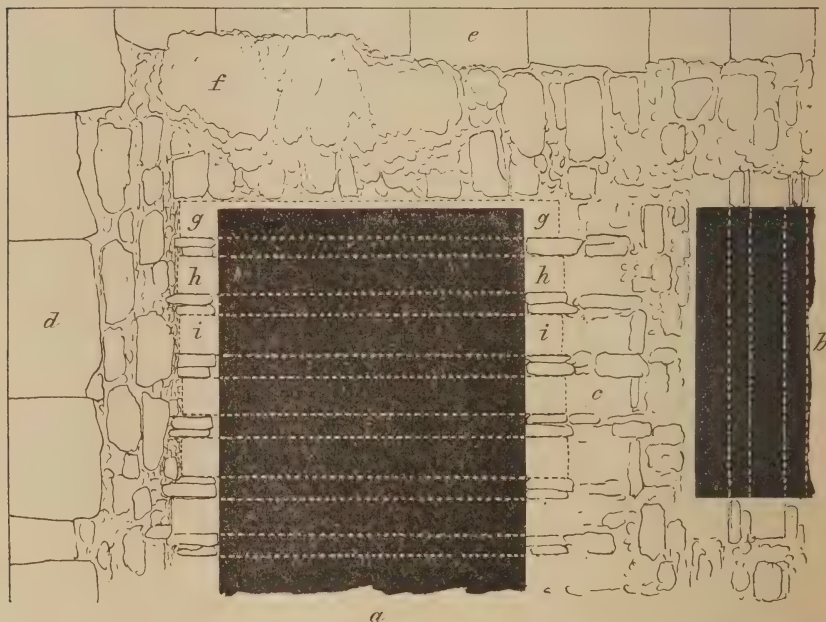


FIG. 96. PLAN OF NORTHWEST CORNER OF QUADRANGLE OF THE GRECQUES, SHOWING THICKNESS OF WALLS AND PLACEMENT OF CEILING BEAMS.

- a*. West chamber with dotted lines indicating beams.
- b*. North chamber with dotted lines indicating beams.
- c*. Wall separating north and west chambers; 4 feet 4 inches thick.
- d*. Upper course of facing stones of west wall.
- e*. Upper course of facing stones of north wall.
- f*. Remnant of concrete roof surfacing.
- g, h, i*. Beam sockets.

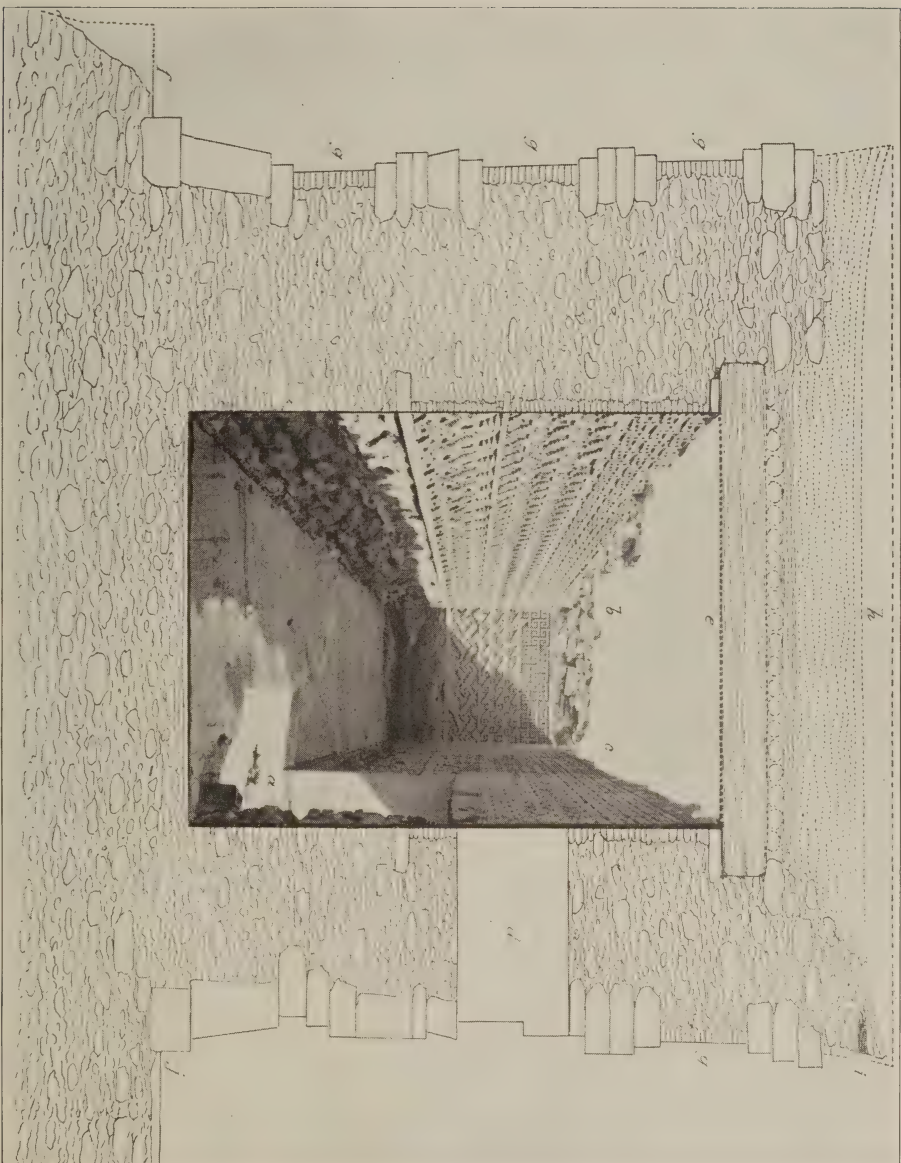
In the section (Pl. XXXV) the character of the walls is expressed with as much accuracy as possible. The outer wall at the left is about 5 feet thick and the courses of stone alternating with the mosaic panels (*g, g, g*) are given in nearly their true proportions, the broken down esplanade appearing at *f*. The inner wall facing the court is from 3 to 4½ feet thick and is faced with courses of hewn stone

PL. XXXV. SECTION AND PERSPECTIVE OF THE WEST CHAMBER OF THE GRECQUES.

Section and view are combined in this plate for the purpose of giving a complete idea of the construction. We look north along the chamber, with the doorway into the court at the right. The walls have a plain dado below, and three zones of grecque mosaic above; these features come forward and appear in the section, as does also the lintel spanning the doorway. The foundation and wall masonry are shown, and ceiling beam and roof are restored.

- a.* Doorway into court.
- b, c.* Portion of the roof masonry surmounting the north wall and showing socket of the end ceiling beam.
- d.* Section of lintel.
- e.* Beam restored in accordance with socket.
- f.* Exterior esplanade, 6 feet high and 5 feet wide (approximate).
- g, g, g.* Sections of grecque panels.
- h.* Suggestions of level and convex roofs.
- i.* Round hole through coping cement.
- j.* Floor of court.

It is possible that the walls as shown are somewhat too thick below. At the points measured the inner wall was 4 feet 4 inches thick and the outer wall 5 feet 6 inches thick. Width of chamber, 8 feet. Photograph by E. H. Thompson.



SECTION AND PERSPECTIVE OF THE WEST CHAMBER OF THE GRECOQUES.

alternating with mosaic panels as is the outer wall; the section here presented, however, cuts so near the doorway that only the upper panel is included. The top of the wall at the right in the section presents the characters observed, not at the point cut by the section, but at the farther end of the chamber where a portion of the cement surface of the roof is preserved; this surface slopes inward with a slight curve as indicated at the left of *i*. The coping course is lost from this upper portion, but at one point at the level of *i* a round opening is seen in the toppling remnant of concrete, which suggests that if the roof sloped inward all around, as indicated in the sketch, it may have been drained by a pipe at *i* into the court. The remnant of concrete with the opening referred to is seen in Pl. XXXIV over the head of the right-hand standing figure.

QUADRANGLE OF THE BASEMENT GALLERIES. Immediately to the left of the Quadrangle of the Columns, as seen in the panorama, is the southern quadrangle of this group with its three partially preserved buildings and a ridge of debris representing the substructure of the fourth. The walls of the north, east and south buildings stand to nearly their full height, but the roofs are entirely gone, and the cut stone facing of the walls is nearly all removed exposing the rough masonry of the hearting; from this the dark adobe mortar is fast falling out promising collapse to the greater masses. It is clear that in these buildings, as in the others, the removal of the lower and more accessible courses of facing stones by modern house-builders has contributed vastly to hasten the destruction of the great buildings. In the panoramic view we see facing us the outer wall of the east and principal building with its remnants of mosaic panels, and get a glimpse within of the lintel stones of the triple doorway which opens into the court. These lintel stones are the largest seen in Mitla. Beyond at the right a view is obtained of the north building with its three doorways seen from within, and at the left is the south building with its much mutilated façade.

The substructures retain their form somewhat fully but no facing is seen, and, robbed of their superstructures, they would be merely oblong mounds of crumbling rubble masonry. Along the south side they are from 12 to 15 feet high, but at the north are hardly half that height. The south end of the east building is shown by Charnay in "Ancient Cities of the New World," p. 511.

These buildings stand well apart, but the terraces, which must have projected a few feet beyond the walls as in the more northern structures, probably approached quite near together at their inner corners, closing in the shallow court. This court is some 140 feet square and

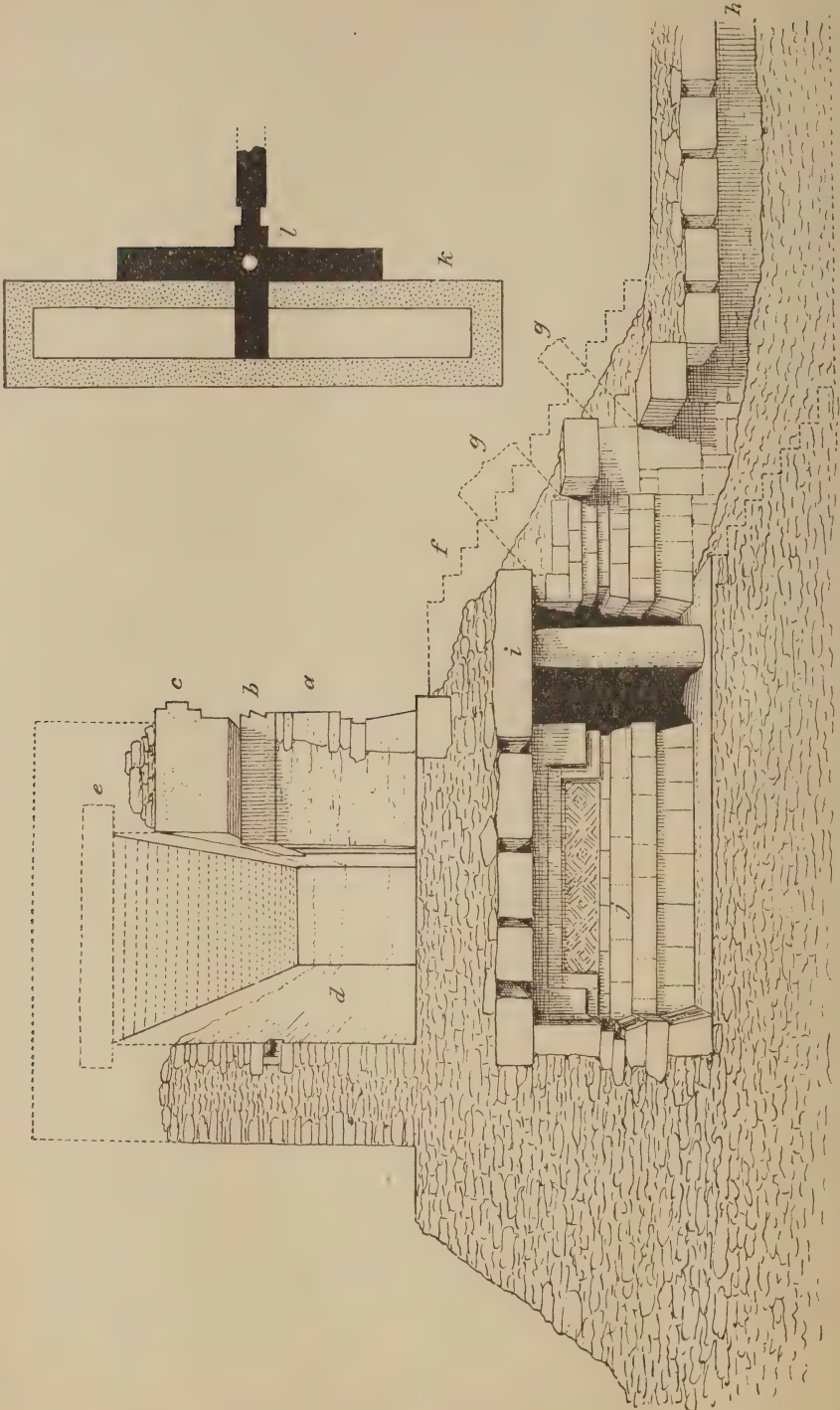


FIG. 97. SECTION AND PERSPECTIVE OF THE BUILDING OF THE BASEMENT GALLERIES.
The cruciform plan of the basement chambers appears in the annexed cut.

- a. Doorway of building.
- b. Capstone of pier.
- c. Lintel.
- d. Chamber.
- e. Roof beams, restored.
- f. Restoration of stairway.
- g. Openings made by removing ceiling stones.
- g'. Closed end of underground passage.
- h. Ceiling stone supported by round column.
- i. North extension of gallery.
- j. Plan of superstructure.
- k. Plan of basement galleries.

is now much filled in about the margins. The buildings were independent of the adjoining quadrangle, but the adjacent terraces were separated by a few feet only. In the sunken pathway between the north building of this quadrangle and the south end of the west building of the Quadrangle of the Columns, there are seen traces of the lower course of the terrace facings, which clearly show this proximity and at the same time indicate that the esplanades about the buildings were of the usual width of 4 or 5 feet.

The northern building possesses peculiar interest because of its basement galleries and underground passage (Fig. 97). The façade has no doubt corresponded somewhat closely with that of the Hall of the Six Columns. There are the same small panels of fretwork in the center of the pier fronts between the doors, the handsomely hewn stone framework, and the four holes for awning timbers in the pillar and jamb caps of the doorway. The squarish doorways and their noble lintels are almost perfectly preserved, as well shown in Bandelier's plate 23. They are 6 feet 6 inches high and 7 feet wide. The triple lintel, 45 feet long and 2 feet high, has no sculptured ornament, but shows traces of light colored paint. The jambs of the doorways have been painted dark red and polished and decorated—at least in part—with graphic subjects in black. The main walls, inner and exterior, show only the rough stonework, but the cement floor retains its dark red finish. The niche occupies the usual place in the back wall. The length of the hall is 83 feet and the width 8 feet. The height of the ceiling and the finish of the walls have no doubt corresponded closely with like features in the buildings of the Quadrangle of the Columns.

Viewing this building from the center of the court we observe, in the slope (formerly the stairway) directly beneath the center doorway, two oblong horizontal openings in the masonry, and get glimpses through them of a round stone column. This column occupies the point of intersection of the two galleries forming the mysterious basement story of the building. I doubt if originally there was any opening at this point, as it would have interfered with the stairway, and the idea of complete darkness—the result of closing those openings—would, it seems, not have been repugnant to the ancient peoples. Entering by an opening at the left where the masonry is considerably broken down, we stand beside the column. As seen in the ground plan, the intersection of the galleries occurs beneath the esplanade and a little in front of the middle doorway, the relations of the various features being clearly shown in Fig. 97. The entrance was by a subterranean passage (the stem of the cross in the plan) approaching

from the center of the court, and this, rising (presumably by several steps) to the level of the basement galleries, has its continuation beyond the column in a gallery 12 feet long, 5 feet wide and 6 feet 6 inches high. The entire length of the cross-arm, which runs east and west beneath the esplanade, is 42 feet; the width and height are the same as in the north gallery. The round column stands a little forward of the center of the intersection of the arms, and is 21 inches in diameter, 6 feet 2 inches high, and tapers slightly toward the top. It is somewhat mutilated as shown in Pl. XXXVI, which is a view looking west with the exit to the left. It supports two great ceiling stones, which are dressed smooth on the under surface, though they are rough on the edges and probably also above. They are from 12 to 20 inches in thickness and between three and four feet wide. The column is absolutely essential to the support of these stones. The ceiling stones of the three galleries and the entrance passage are similar in character but narrower. They are set a few inches apart, and by looking up between them one can see that rough stones extend along the apertures supporting the thick rubble mass of the floor above. The entire thickness of this floor between the ceiling surface and the surface of the floor of the superstructure is about 5 feet, as indicated in the section, and readily demonstrated by referring to a photograph of the front of the building, published by Bandelier.*

The walls of the apartments are neatly finished in every way and decorated with panels of fretwork resembling those of the exterior of this and other buildings. The work is a little heavier than in other cases, and the figures are arranged in somewhat peculiar ways, but all are much alike in motive and execution. The character of the framework of the panels and the wall space below is indicated in the section, and is clearly shown in the photograph reproduced in Pl. XXXVI. The sides of the entrance to the underground way are faced with cut stone in the usual style of exterior surfaces. The ceiling descends in steps, as indicated in the section, until the level of the passage ceiling is reached—a little lower than the floor of the galleries. The stairway is destroyed or covered up, and the passageway is so filled with debris that only a foot or two of open space remains next the ceiling. By crouching low one may see into the passage 10 or 15 feet. About 6 feet from the column the side walls contract a few inches, and then a little farther on expand to 3 feet 6 inches, so that the passage is narrow, and its height was probably not more than 5 feet. Of course it is useless to speculate as to the nature of the remainder of this passage; I incline, however, to the view that the entrance was located somewhat near the center of the

* Mexico, pl. XXIII.

PL. XXXVI. BASEMENT GALLERIES AND COLUMNAR ROOF SUPPORT.

In this view we look west along the gallery which extends beneath the stairs and esplanade in front of the north building of the Quadrangle of the Basement Galleries. The light comes in at the left through an opening recently made in the roof of the passageway under the court. The column supports heavy ceiling stones, and stands at the intersection of the north and south with the east and west galleries. The opening of the north gallery, seen at the right of the column, is directly beneath the central doorway of the building above. The paneling and masonry are seen at the right. Height of column, 7 feet.



BASEMENT GALLERIES AND COLUMNAR ROOF SUPPORT.

court. By reference to one of Dupaix's plates (Kingsborough, Vol. V.) it will be seen that the walls of the passage are ornamented with mosaic fretwork in the usual style. It is also seen that the artist who made the drawing had reason for indicating the termination of the passage at the distance of perhaps 15 feet from the intersection of the galleries. Whether a stairway led up to the surface at this point or whether there was a turn or other feature cannot be determined until the Mexican authorities decide to undertake further investigations. It seems to me highly probable that the galleries were devoted to mortuary uses.

The east building has been a noble structure, corresponding closely in size and appearance with the wider structures of the Quadrangle of the Columns. The length of the apartment is about 120 feet and the width 22 feet. The latter measurement indicates the probable use of columns for supporting the roof timbers, as in the Hall of the Columns, though no traces of these are now visible, and the floor shows no sockets into which columns could have been inserted. It should be remembered in this connection, however, that these chambers have almost certainly been used by post-Spanish residents, and that the floors, if defective, would have been subject to recementing. Indeed it is hard to say of any of the floors in the better preserved buildings that they are certainly aboriginal. I may add that to me there seems no apparent reason why pillars of wood instead of stone should not have been used in supporting the roofs of these buildings. The walls are almost completely denuded of their cut stone facing, save on the south and east exteriors where large portions toward the top, beyond the easy reach of vandals, remain in place. The fretwork panels, of which there are only two zones in place (see panorama), are identical in style with those of the better preserved Quadrangle of the Columns. Two fine panels, about 25 feet in length, ornament the south end, and six, preserved in whole or in part, remain on the east wall. Over this eastern wall in the panorama, the inside of the front wall and the tops of the three doorways are seen. The lintels spanning the latter are between 19 and 20 feet in length. The diversity in published measurements of these stones has probably resulted from the fact that the ends are uneven. The width is 5 feet and the thickness or height 3 feet 7 inches, not counting the elevations of the untrimmed upper surface. The doorways are 7 feet 8 inches high and about 8 feet wide. The jamb-stones—two only occurring, as usual, and these at the outer sides of the end doorways—are 7 feet 8 inches high, 5 feet 5 inches wide and 3 feet thick. The capstones of the pillars are almost as massive as the jambs, and

there are some very heavy, roughly dressed stones built into the pillars. The cemented floor retains its red surface, and the sides and soffits of the doorways are painted red or a pale reddish tint. The three lintels, as in other buildings, are treated as a single stone, and the lower half of the face is recessed and filled with lines of fretwork, neatly sculptured and retaining pale reddish paint in protected parts. Small panels of mosaic fretwork appear on the pillar fronts, and there are also remnants of great panels, in the same style, above the lintel, and to the right and left of it.

The south building corresponds very closely with that on the north, the apartment measuring about 8 by 84 feet. The terrace rises 5 or 6 feet above the general level of the court and is from 12 or 14 feet high on the outside at the south. The walls vary from 10 to 12 feet in height and show only the rough, weathered masonry, save on the exterior, where a portion of the base course of dressed stone is still in place. The three great doorways and their massive lintels, jambs and pillar-caps are preserved, as indicated in the panorama which shows a considerable portion of the façade. At the back of the hall is seen also the mysterious, stone-framed recess.

GROUP OF THE ARROYO. The resemblance of this cluster of quadrangles in its leading characters to the groups already described is so close that detailed description seems superfluous, and the panorama and ground plan must be largely relied upon to tell the story. The group can be seen in the panorama over and beyond the quadrangle last described. There are three quadrangles, differing from those already described only in minor details of placement, plan and elevation. Like the buildings of the northern group, these structures rest upon the unchanged surface of the gentle slope. The walls are now nearly all reduced to the level of the great lintels, which are so heavy as to have caused a halt in the depredations of modern house-builders. The arroyo, some twelve feet deep, passes close under the east walls threatening their destruction, and the roadway skirts the group on the north and west. The north and middle quadrangles coalesce, while the southern one is set apart and to the west, and is separated from the middle quadrangle by a space of 6 feet. The courts vary but a few feet in their dimensions from the corresponding courts of the Group of the Catholic Establishment. None of the buildings seem to have been so wide as to require columns for the support of the roof. The outer walls of the north and east buildings of the northern quadrangle are leveled with the ground and the same is true of the walls of the southern buildings of the middle and south quadrangles—assuming that these structures once

existed. It is especially to be noted that the north court connects with the middle quadrangle by a dark, crooked passageway—as in the other groups—and that there are in none of the buildings traces of exterior doorways. The courts have communicated with their inclosing buildings by means of the usual doorways, the lintels of which measure from 10 to 15 feet in length, some being as much as 4 feet 6 inches wide and 3 feet thick. A remarkable feature of these lintels is the preservation in places of portions of painted designs which originally covered the entire sunken panel of the lower half. The best examples are found in the southern court, where the panel was a foot in width and about 36 feet in length, as shown in the sketch, Fig. 91. A small portion of the painted design from this lintel is reproduced in Fig. 90.

The walls have been faced with cut stone, as indicated at several points where destruction is not yet quite complete. They have been ornamented with fretwork panels, as in the other groups, and specimens of the dentate stones are scattered along the base of the walls.

GROUP OF THE ADOBES. This appellation expresses the chief distinctive feature of the group, of which portions of the mounds or pyramids on which the buildings stood are alone preserved. The east and north mounds are seen in the panorama over the Quadrangle of the Columns, E, and their position and relations with the group are clearly shown on the map. Without excavation we can learn little of the character of these structures or the nature of their surface finish. Though built chiefly of adobe, they may have been faced with cut stone and elaborately decorated with fretwork, as in other cases. The main mound shows traces of terracing and doubtless the others have been terraced, as indicated in a plate published by Dupaix. The eastern mound is much larger than the others, and probably supported the principal building. It is 30 feet high, and the summit, which is about 60 feet from east to west and 80 from north to south, is now occupied by a small Christian chapel of primitive design and construction. The north, east and south slopes are quite steep and much weathered and scarred, while the west side has been cut away by late occupants of the court and is vertical for two-thirds of its height. The adobe bricks used are about 15 inches long, 6 inches wide and $2\frac{1}{2}$ inches thick, and are heavily bedded in a matrix of coarse adobe. The base of the mound is composed partly of stones irregularly imbedded in adobe soil, as in other examples.

The dimensions of the court cannot be accurately determined, but it must have been at least 150 feet square. The northern structure is now represented by an irregular mound of adobes, some 10 feet high,

20 or 25 feet wide and 40 or 50 feet long. The west mound is perhaps 80 feet long, 25 feet wide and 10 or 12 feet high. The south member of the quadrangle is reduced to a low ridge of earth. These remnants are being rapidly reduced by the present occupants of the site, and it is hard to believe that forty years ago they were as well preserved as indicated in the Dupaix plate. I had no opportunity to search for traces of possible associated groups, and shall only mention the occurrence of a large squarish block of stone a few yards beyond the mounds on the northwest.

SOUTH SIDE GROUP. At the extreme left in the panorama and beyond the steep banks of the Rio Mitla is seen a massive mound rising above the numerous clusters of dwellings and their accompanying masses of dark foliage. This is all that remains of a great structure that once formed the east member of a quadrangle identical in plan with those of the north side. Between this group and the

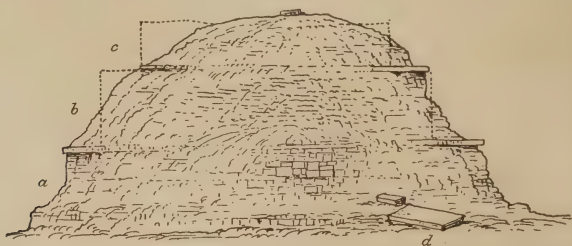


FIG. 98. SKETCH OF SOUTH END OF PYRAMID SHOWING CONCRETE FLOORS.
a, b, c. Terraces. d. Slab of concrete descended from above.

creek are traces of a second quadrangle, represented on the north and east sides by low mounds of earth and stones. This cluster lies directly north of the better preserved quadrangle and probably held to this group the same relationship that the northern buildings of the other groups held to their adjoining structures. Its presence suggests the possibility of a third quadrangle at the south, but so far as I know no traces of its presence have been noted.

The east member of the main quadrangle was probably one of the grandest of the Mitlan structures. The pyramid is nearly 30 feet high and at the base measures about 100 by 120 feet; the flattish summit preserves nearly its original dimensions, having been protected by a firm cement floor, and measures 60 by 80 feet; resting on this is a low mass of earth, about 5 feet high, having near the middle remnants of a Spanish building, probably a church. This massive pile is composed of stones of various sizes and shapes

imbedded in adobe, as in many of the north side structures, but we cannot at present say whether the facings were of stone or cement. The most noteworthy feature of this pyramid is the cement or concrete floors of the terraces, which are so firm and thick as to stand out in places far beyond the crumbling slopes, as shown in Fig. 98.

The terraces are about five feet wide, and probably extended entirely around the pyramid, save where interrupted by a stairway or stairways. These floors occur at the south end, as indicated in the sketch. At the base is a large slab of this flooring, some 7 feet long and 4 feet wide, which has fallen from above and remains intact and as firm as a slab of stone. It is 7 inches thick, and is composed of coarse, gravelly concrete, surfaced with finer mixtures. Portions of the masonry of the lower story at the south end are preserved, and some of the rough vertical wall of the second story is still in place. The floors have frequently been repaired by adding thin coats of cement, and after each application the surface has been painted red and polished.

The north pyramid was about the same in length as that on the east, but was much inferior in width and height. It is composed of stones and earth and is about 18 feet high, 30 or 40 feet wide and upwards of 100 feet long. The cement floor and portions of the walls of the superstructure are still in place. The length inside was about 80 feet, and the width 15 feet. A partition wall extended the full length of the building, dividing the space into two parts, one being about 5 feet wide and the other 8. Traces of cross walls occur in two or three places, indicating a separation into rooms of unequal size.

The west structure is represented by an oblong mound about 12 feet high and 25 feet wide at the top; its south end has been nearly leveled with the ground. The southern structure is still further reduced, and is represented by a low ridge from 3 to 5 feet high. The court is occupied by modern dwellings, and the work of destruction is going on at a rapid rate.

THE FORTIFIED HILL. One of the most unique and striking features of Mitla is the fortified hill, situated about a mile to the west of the village. Its position and general topographic character will be understood by referring to the panoramic view, and numerous details are given in the accompanying illustrations. The hill is an outlier of the highland facing the fields that border the stream on the north, and is separated from the adjoining bluffs and slopes by an encircling depression. It is a great mass of barren rock with a flattish top from which a spur descends toward Mitla at such an angle as to make the ascent quite easy. The summit proper, wholly occupied by the

fortification, is perhaps 400 by 1,000 feet in extent; the base is half a mile in length from southeast to northwest, but less than half as much in width. Viewed from the direction of the creek, a long, rather low face is presented, rising from the gently sloping field in a steep, even incline; this becomes rugged above and ends in an irregular, broken precipice, crowned by the walls of the fortress. On the west and north the sides are steeper and more rugged. Great bodies of the rhyolite rock are seen protruding at every point, while many masses, dislodged from the ledges above, surround the hill on all sides. Vegetation is sparse, and consists mainly of scrubby trees, cacti and brambles. A photograph made from the south shows so little of the crowning structures that it is not considered worth reproducing, but a view made from the rocky approach near the crest on the Mitlan side is given in Pl. XXXVII. This view is very unsatisfactory, but there is no point from which any more comprehensive view can be obtained. In the picture we see the outer wall crossing the crest from side to side, terminating in a great, detached, rounded rock at the right; beyond this is the second and higher wall, and we catch a glimpse of two piles of buildings occupying the higher position within the inclosure. I stood on the inner wall with my hat held aloft while Mr. Thompson made the view, and a definite idea of the proportions of the several features of the picture is thus conveyed. The gateway—or opening rather—in the first wall is at the left in the plate, and the passage through the second wall is a little farther to the left. Our visit was hurried and, as a second visit was contemplated, a careful survey was not undertaken; but the second visit was never made, and this I regret greatly, as the maps published by previous visitors are far from satisfactory.

The summit proper is surrounded by a massive wall of unhewn stone, laid up with some regularity, but apparently without mortar, save in special limited places where the foundations were exceptionally steep. The wall follows the uneven margin of the crest, with many ins and outs and ups and downs, and was evidently intended to make the place impregnable to an enemy. Where the cliffs are precipitous only sufficient masonry is added to make them wholly inaccessible; where the slope is gentle, as on the east side, the wall is zig-zagged, showing decided appreciation on the part of the builders of the advantages of the system of salients and re-entering angles. On the gentler slope, where approach was easy and the single wall was not considered sufficient, a second wall was carried across 20 to 40 feet outside of the first and the ends were joined to the main wall at the sides where the precipice begins.

The entrance through the outer wall, shown in the photograph, is near the middle of the outer wall and at the highest point in the profile of the ridge. This has been regarded by all visitors as the original entrance way, but I was led to question this by observing that there is also an opening at the northern termination of the outer embankment. It would seem that this is the natural place for the gateway. An enemy would have to approach by a precipitous slope in full view of the overhanging walls and pass over a raised rock-bound threshold 12 feet wide, between the inner and higher wall and



FIG. 99. GATEWAY OF FORTIFICATION, LOOKING OUT.

a, a, a. Inner wall with heaps of stones intended for use in defense. *b.* Outer wall.
c. Space between walls. *d.* Gateway. Height of walls from 10 to 16 feet.

a colossal boulder, 25 or 30 feet in greatest dimensions, with which the outer wall terminates. On entering he would be compelled to pass between the two walls along a depressed space and fully exposed to the missiles of the besieged for several hundred feet, before reaching the inner entrance near the south side. That it was expected or feared that he would thus enter is clearly indicated by the occurrence of piles of roundish stones—mostly of yellowish flinty quartzite, in many cases rounded by pecking and well fitted for use in a sling—at short intervals along the top of the wall. My sketch, Fig. 99, shows these

piles of stones—which are not confined, however, to this part of the fortress—and also gives a correct impression of the boulder-guarded gateway, looking out. An examination of the opening developed the fact that there are no traces of a connecting wall between the great portal boulder and the inner wall opposite. The walls at this point are from 6 to 10 feet wide on top, the sides inclining inward a few degrees. The gateways through the outer and inner walls are mere openings, from 6 to 10 feet wide and much broken down at the sides. It is doubtful if they were ever well or systematically faced up and, as I have suggested, it is a reasonable question as to whether the outer opening is really an original gateway or a breach made by recent occupants of the site who use the enclosure as a pasture and outlook. Following the wall along the southern margin of the summit, a second opening is encountered near the west end, through which a steep descent may be made to the fields. Farther on the rocky summit slopes off to the north so that the zigzag wall, following the edge of the precipitous slope, is quite a little below the crest. I am not positive that there is not a third opening through this part of the wall.

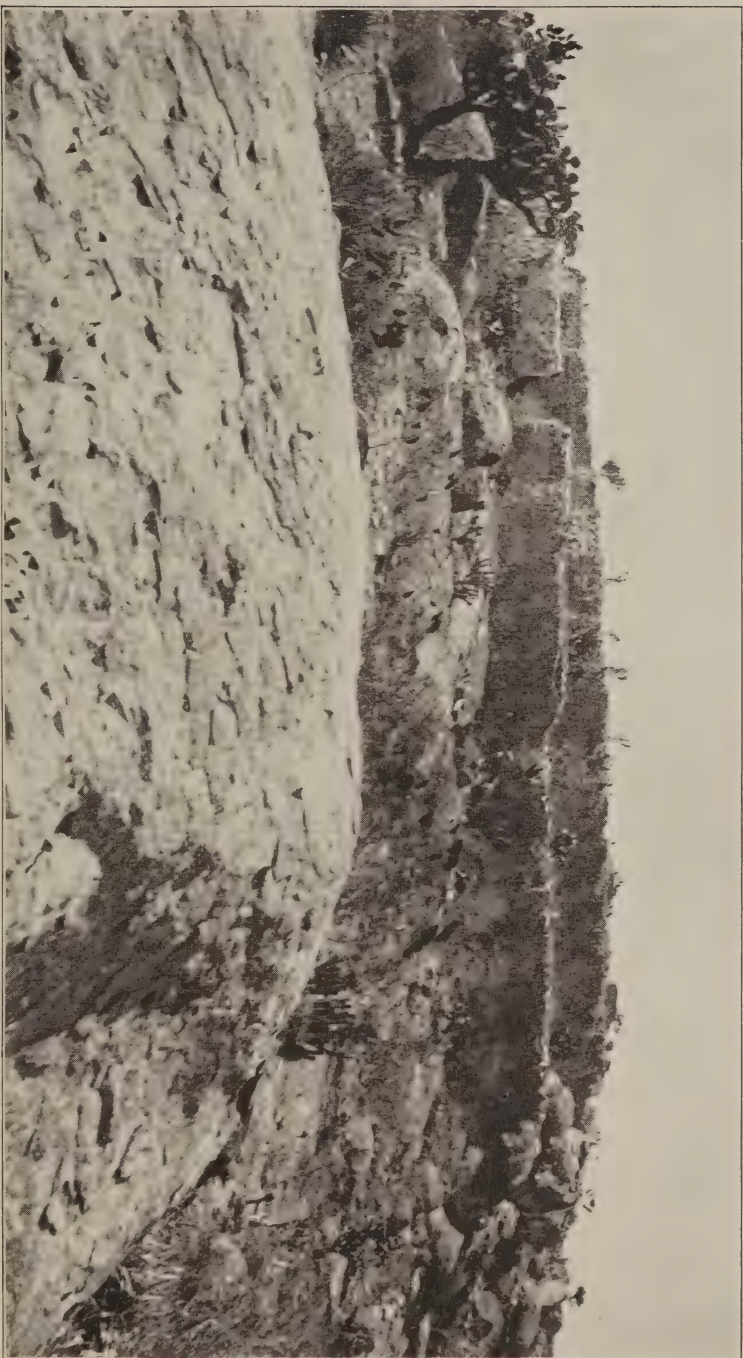
Entering the exterior opening on the Mitlan side, the visitor turns to the left along the outer inclosure, which is much encumbered with bushes and, passing through the inner gateway, ascends a gentle slope to the crest. Here an interesting group of ruins is encountered, the first member of which overlooks the boulder-guarded gateway and the valleys beyond, and affords a fine panorama of Mitla and the whole upper sweep of the valley. The group of structures consists of three members arranged to form three sides of a quadrangle. The east and south buildings are of adobe, resembling in plan and appearance the adobe ruin of the south-side group in Mitla. The foundations are of adobe, and serve merely to level up the ground and support the superstructure, projecting only slightly beyond the walls. The latter, formed of dark adobe filled with potsherds, are much broken down and do not exceed 8 feet in height at any point. They are 2 or 3 feet thick and show traces of partitions and doorways. The third member of the group is an oblong stone mound which has the appearance of greater antiquity than the other ruins, and probably originally accommodated some sort of superstructure; between this and the north building the sloping ground is leveled up somewhat by a platform faced on the north with stone. The three or four ruins within the inclosure back of this group are much dilapidated and present no new features.

There are everywhere traces of occupation, and the presence of many potsherds and occasional mealing stones indicates permanent

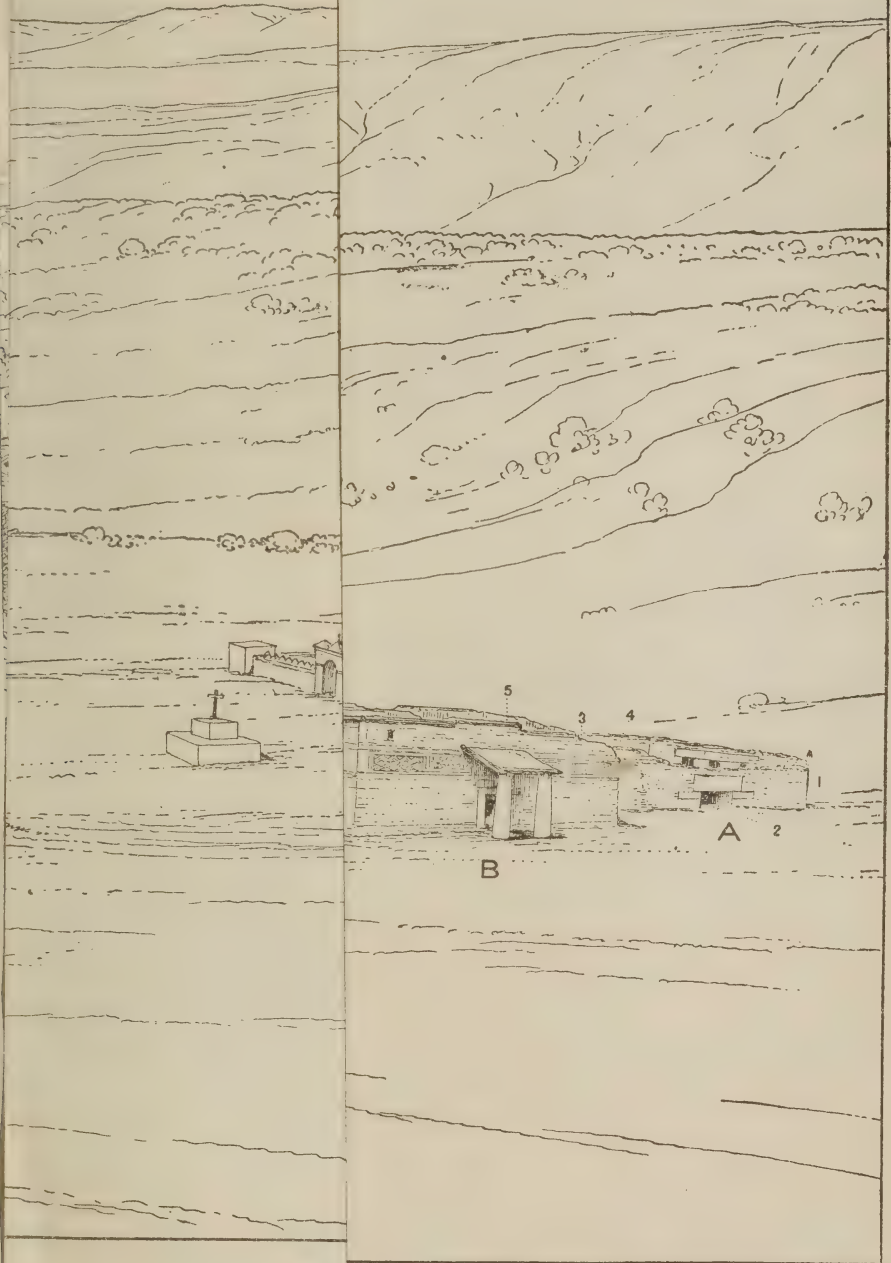
PL. XXXVII. THE FORTIFIED HILL; EASTERN WALLS AS SEEN FROM WITHOUT.

The view shows the approach by way of the rocky but gradual ascent from the Mitlan (east) side. On the north, south and west sides the approaches are very steep. The point of view chosen is the only available one, and is too low to give a good idea of the fortification. The outer wall is in front with the present gateway at the left; the original entrance to the intra-mural space was probably at the right where the wall terminates against some large boulders. The opening through the inner wall is at the extreme left, so that an enemy entering at the right would have to pass the entire length from right to left (some 300 feet) exposed to attack from the inner and higher wall. A small portion of the east wall of one of the adobe buildings is seen above this wall toward the right.

While Mr. Thompson made the view the writer stood on the inner wall a little to the left of the middle of the picture with hand held aloft, thus affording a means of estimating dimensions.



THE FORTIFIED HILL; EASTERN WALLS AS SEEN FROM WITHOUT.





A, B, C. Group of the Catholic Establishment.

D, E, F. Group of the Columns

G, H, I. Arroyo Group.

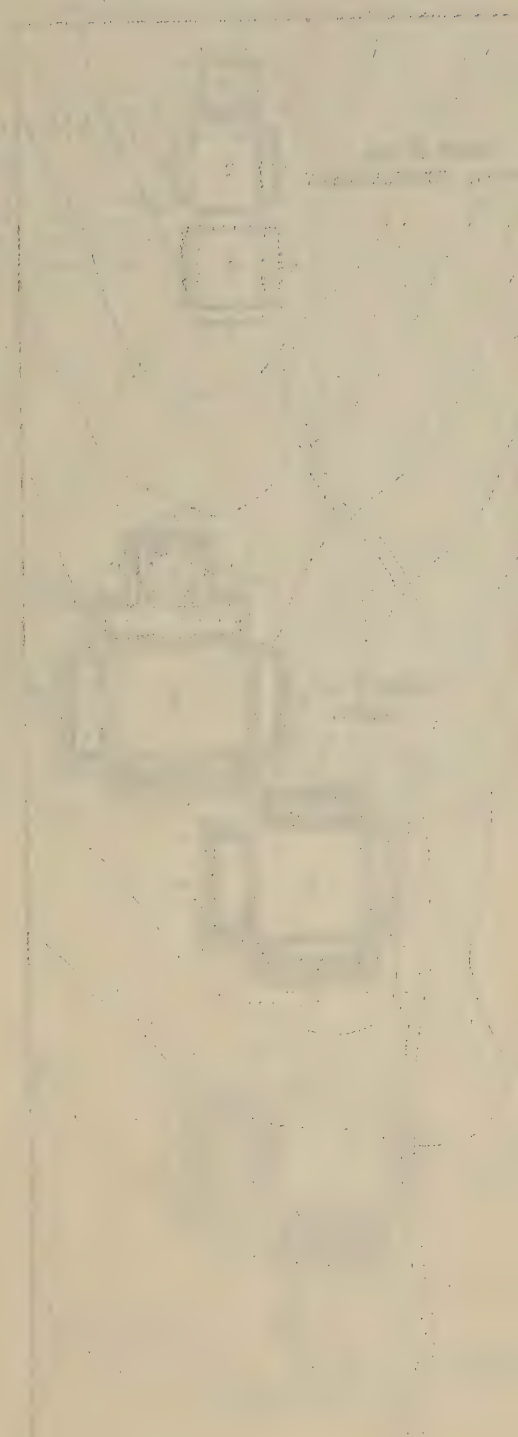
J. A-foe Group.

K, L. South Side Group.

M. Fortified Hill.

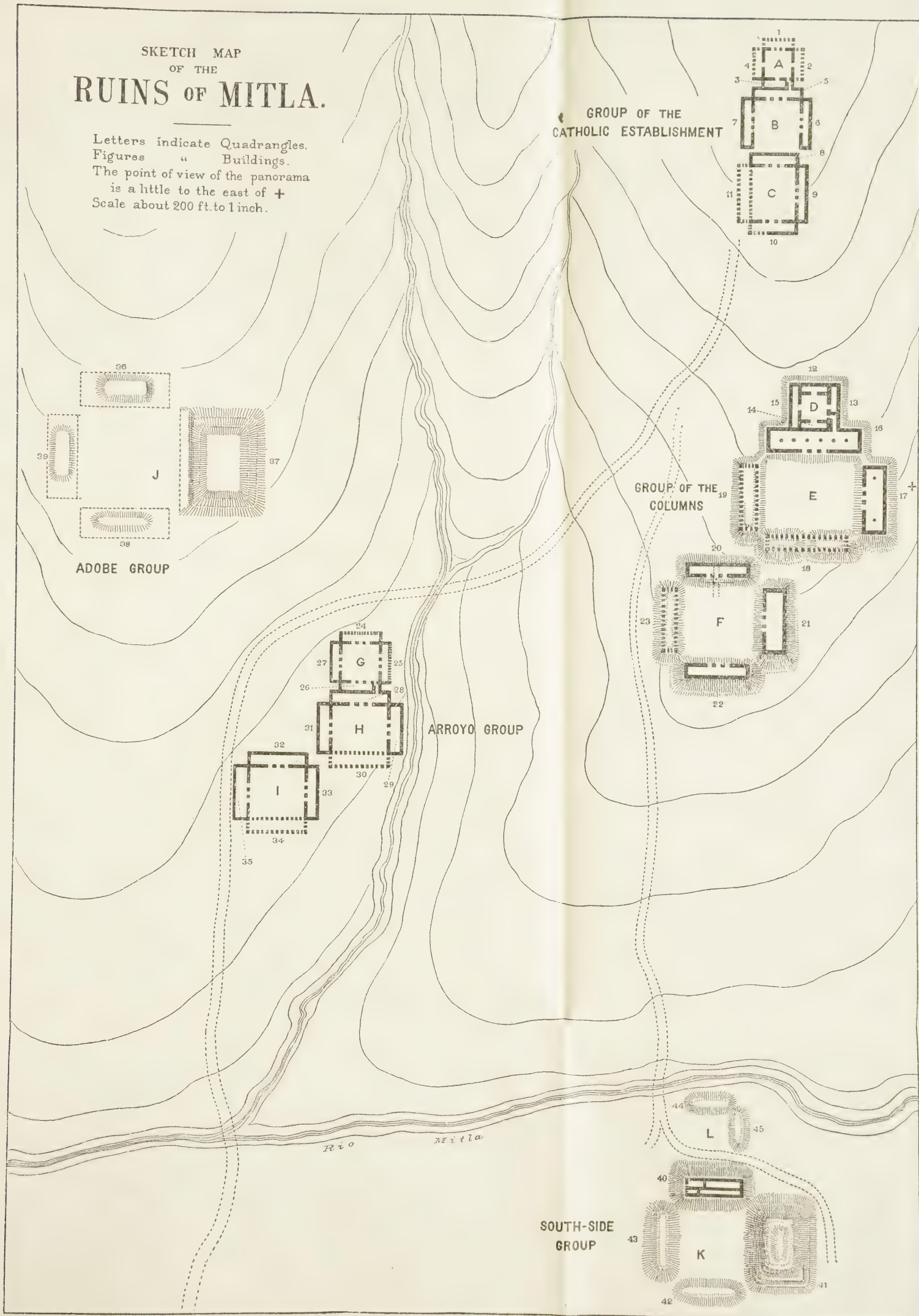
N, N. Rio Mitla.

PANORAMIC VIEW OF MITLA.
LOOKING WEST



SKETCH MAP OF THE RUINS OF MITLA.

Letters indicate Quadrangles.
Figures " Buildings.
The point of view of the panorama
is a little to the east of +
Scale about 200 ft. to 1 inch.



dwelling. Water was probably obtained from a spring at the base of the hill on the Mitlan side. It seems not improbable that burials may be discovered on such parts of the hill adjoining the buildings as contain sufficient soil for the purpose, as a recent visitor, Mr. W. F. Parker, of Omaha, Neb., unearthed some human bones together with various minor relics near the eastern gateway.

It strikes me as not improbable that this fortress is of rather recent construction, as the loosely built walls are remarkably well preserved; and the presence of adobe buildings also suggests a late if not a post-Spanish occupation. That the final desertion of the stronghold was comparatively late is well shown by the fact that the numerous piles of stones intended for defense have not wholly lost their character as conical heaps. It is to be observed further that though many of these stones are artificial in shape they were certainly not rounded for use in defense, but are merely pickings from the neighboring fields where they were originally used, probably as hammers, and where similar forms still occur in great numbers.

QUARRYING AND CUTTING STONE. The discovery of the quarries from which the ancient inhabitants of Mitla obtained their building stone is a matter of much interest to the student of pre-Spanish America. The existence of such quarries is mentioned by several writers, but little information is given save that they are located somewhere along the bluffs and mountain sides near the city. Having devoted much time to the study of quarry phenomena in the United States where the primitive tribes quarried and worked flint, soapstone and mica, and mined copper, I was especially desirous of learning something of this class of work as carried on by nations representing the most advanced culture of the Western Continent. I hoped that some important light might be thrown upon the question of the methods employed in working stone by these peoples. Was the work done by the aid of stone tools and were the half civilized nations yet wholly within the shadow of the stone age, or had they processes and mechanical appliances wholly unknown to us and to the historical peoples with whom we are more fully acquainted?

I was fortunate in securing much evidence upon this point and have reached the conclusion that there is no specific distinction between the work done at Mitla and that of the soapstone workers in Virginia, Pennsylvania and Connecticut; that stone tools were extensively if not exclusively used, and that the picks, axes, sledges and hammer-stones employed were of forms familiar to most of our aborigines.

The stone used by these builders for facing their walls within and without, for the great lintels and door jambs, for pillars, stairways, columns and ceiling stones, is a variety of volcanic lava known as trachyte. It is a massive light gray rock of moderate density and hardness but reasonably tough and durable and easily split and hewn. It is the main constituent of the mountain masses that surround and overlook Mitla, and outcrops in the bluffs and higher cliffs on all hands. Where the compact lava flows overlies rocks of less durability they are undermined at the margins and break down of their own weight, leaving the fresh surface exposed and in many places visible from the valley. The huge detached masses, more or less rounded by weathering, lie along the precipice base and scattered down the slopes.

The builders of Mitla sought and used not only these convenient masses, but went much farther and attacked the solid rock in place, cutting it out in large bodies which were transported long distances over rough country. For ordinary purposes of building the smaller masses of stone could be obtained near at hand, and great quantities were used for pyramids and terraces and for the hearting of massive walls; but to secure bodies for cutting and carving they did not hesitate at great undertakings. Leaving the multitude of rough masses that lay near at hand, as, for example, at the base of the fortified hill a mile away, they followed the lower outcrop several miles to the east, and even climbed the mountain ridge at the north in search of stone exactly suited to their rude but effective chisels.

The nearest evidence of work so far as observed is at the base of the lower bluff on the north side of the valley two miles east of the ruins. From this point transportation was comparatively easy as the way was down gentle slopes cut only by occasional arroyos and smaller gullies which could be passed without great difficulty. But the main quarries are found on the upper slopes of the range to the north nearly a thousand feet above the city and five or six miles away. The feats of engineering necessary to transport masses of stone many tons in weight down a thousand feet of precipitous mountain face, accomplished by these stone age quarrymen, would be regarded as important undertakings even by our enterprising engineers of to-day. Their means and appliances were no doubt extremely simple, and much time must have been consumed in the work. In view of the vast results accomplished I believe we are warranted in assuming the employment of large numbers of men directed by a despotic power—a power not limited by the life of an individual but continued without break from generation to generation.

We have not secured any direct evidence of the means of transportation, though this may be done in time; and it is possible that even the routes over which the great stones were carried may yet be traced upon the mountain sides.

For the present I must content myself with the evidences of quarrying and cutting stone, which are sufficiently remarkable and so well defined that speculation need not enter into the presentation of the case. Mr. E. H. Thompson, who was my companion and co-laborer throughout the trip, visited the high mountain quarries known to the present natives of Mitla, while I skirted the lower bluffs seeking traces of the workings that it seemed, from the character of the cliffs, should exist there. Taking a guide and horses he

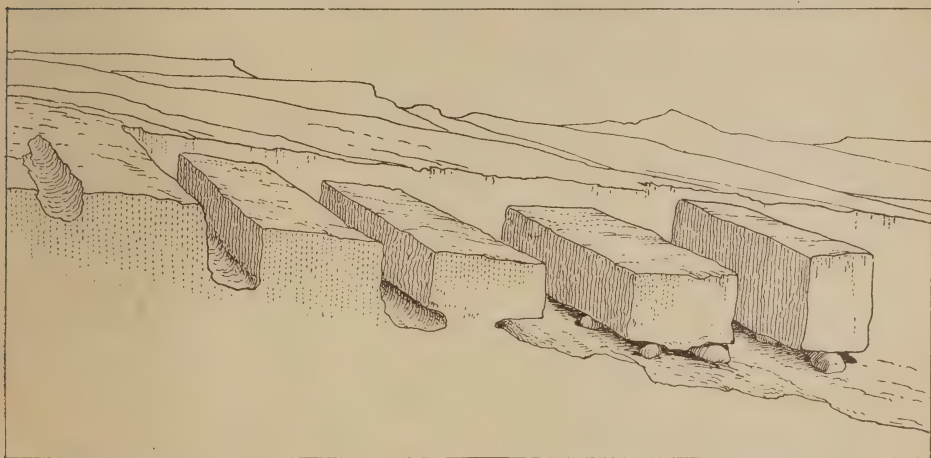


FIG. 100. METHOD OF CUTTING OUT BLOCKS OF TRACHYTE IN THE QUARRY. DRAWN FROM DESCRIPTION OF MR. THOMPSON.

climbed the mountain to the north, and just before reaching the summit, nearly a thousand feet above the village and at least six miles away, encountered the quarry. About it were several large blocks, already removed from their beds, while others had been left partly cut out or only outlined. The work had been undertaken on the sloping surface of a solid mass of the trachyte. Channels had been cut the full length of the blocks desired and to the proper depth, and likewise across the ends; when these were widened sufficiently, undercutting was begun and carried on until the mass was severed and could be broken off by the aid of levers or wedges of wood, possibly aided by water. After the removal of one block the amount of cutting for each stone was reduced somewhat, as one side only, instead of two, had to be channeled. The channels observed were a foot or more wide and

the depth was about three feet in the deepest. Figure 100 will sufficiently indicate the nature of the work, though in a very formal way. The stone at the right has been removed and set upon edge; the next one is free and blocked up on small stones; the third is well undercut and the fourth is channeled nearly to the full depth.

The larger blocks among the half dozen wholly removed and set on edge are 12 feet or more in length by 5 or 6 wide, and from $2\frac{1}{2}$ to 3 feet thick. Such a stone would weigh perhaps fifteen tons. The intention of the quarrymen was possibly not to carry these blocks directly down the mountain but to take some roundabout way that would give reasonably gentle slopes.



FIG. 101. PARTIALLY HEWN BLOCK OF TRACHYTE AT BASE OF LOWER BLUFF TWO MILES EAST OF MITLA.

My own observations along the lower bluff were of equal interest and furnished important evidence as to the work of cutting and dressing the stone. The most striking illustration is that furnished by a partially hewn block lying at the base of a massive overhanging wall two miles east of the ruins. Originally the mass was about 25 feet long and probably averaged 5 or 6 feet wide and as much in height, though far from regular in shape. The work of shaping this stone and dividing it into parts was well under way when operations ceased.

The pick marks are everywhere distinctly seen and the heavy stone picks lie all around the massive block with their bruised points and flaked margins almost as fresh looking as if sharpened and used but a year ago. The remarkable outline to which the block had been reduced when the work ceased is best shown by the sketches presented in Figs. 101 and 102.

The top and portions of the sides had been reduced to approximate shape, but it was evidently intended to cut the mass up into a number of pieces. This may have been the original intention, or may have resulted from the appearance of a flaw which crosses obliquely nearly through the center of the stone. At any rate, the cutting of the sides and top indicates that it was planned in the first place to separate the mass into at least two blocks, as the faces of the larger end are not on a line with those of the smaller end.

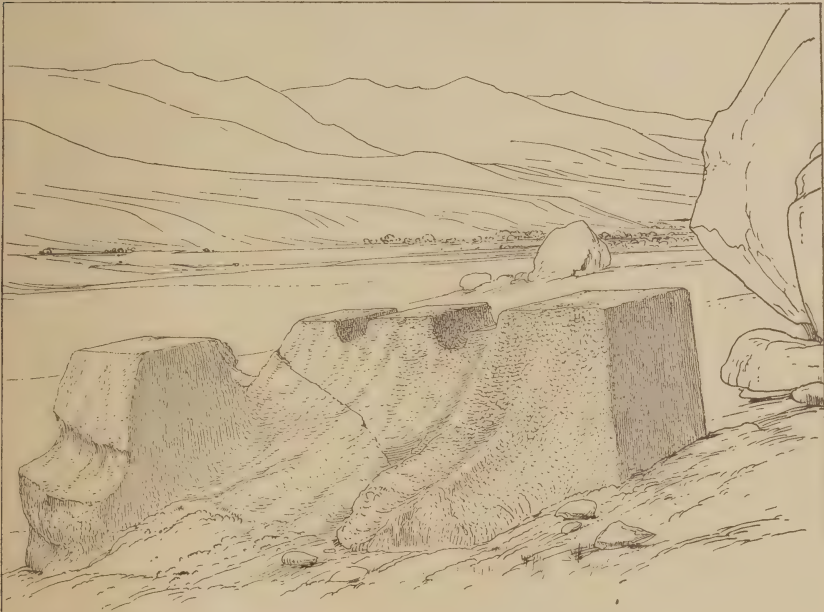


FIG. 102. PARTIALLY HEWN BLOCK OF TRACHYTE SHOWING PROGRESS OF CUTTING.

The method pursued in dressing the stone is readily observed. The upper surface was first leveled off and the size of the block or blocks determined upon; then the work of hewing the sides and ends began. The top was outlined all around and the vertical cutting followed. As seen in Fig. 101 the farther end is squared down to the ground, but the larger mass at the front is not yet half cut away, large projections below remaining to be removed. On the other side the work is even less advanced, as shown in Fig. 102.

All over these surfaces are seen the evidences of tedious labor; here a workman had pecked away until a broad shallow channel, deepened to the proper plane, was carried down toward the base. Next this is another area of cutting, and beyond another and still another, as if many workmen had labored side by side, leaving low ridges between the area covered by each. Though lying here open to the weather for more than four hundred years, the pick marks are clearly visible, and even the direction of the stroke and the width and nature of the blunt point of the pick are strongly suggested.

Difficult as was the dressing of the top and sides, the cutting of vertical channels for dividing the blocks, and the undercutting required to remove irregularities of the base, must have been much more formidable. The cross channels, as indicated in the drawing, are wide and somewhat irregular, and had not reached much more than a foot in depth in any case when the work ceased. The work as a whole presents close analogies with that done in the soapstone mines of the United States, where channeling and undercutting, though on a smaller scale, were constantly resorted to.

Turning from this most interesting and instructive illustration of the nature of the work done by the ancient stone cutters, I sought traces of the tools employed and was repaid by numerous finds. Scattered all around were battered, pick-shaped stones, irregular sledge-like masses and rounded or discoidal hammer-stones. These

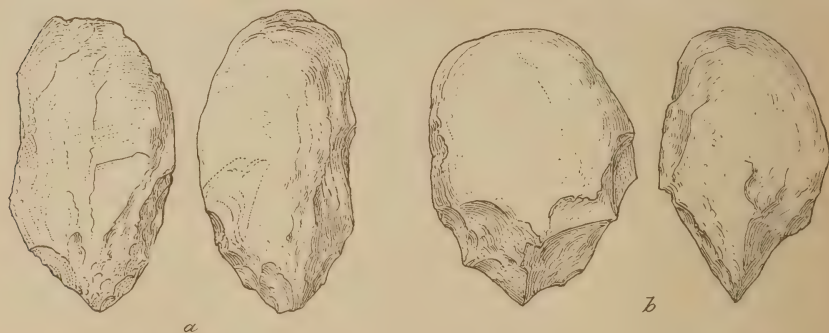


FIG. 103. PICKS FOUND IN THE VICINITY OF THE LARGE, PARTIALLY HEWN STONE.

tools were undoubtedly used in the stone cutting operations, as apparently no other work had been carried on in the vicinity. They were made of roundish masses or of water-worn boulders of the harder varieties of volcanic lava brought from the valley below or from some more distant locality. In appearance these implements were exactly like the rude picks found in our northern quarries and on village sites in many parts of the country. Typical specimens are shown in

PL. XL. STONE PICK FROM A MITLAN QUARRY.

This is a typical example of the large, rude picks found in considerable numbers in the quarry, two miles east of Mitla. It was sharpened by fracture, and was doubtless hafted when in use. One-half actual size.

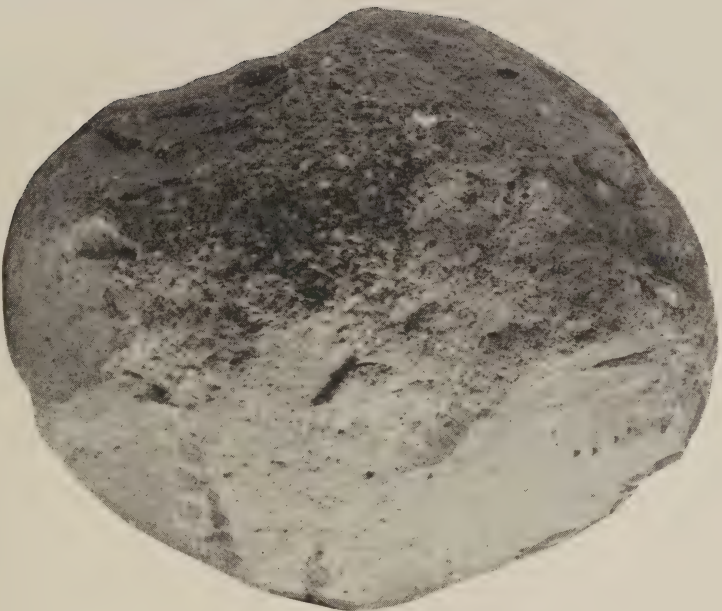


STONE PICK USED IN QUARRYING STONE. (ONE-HALF ACTUAL SIZE.)

PL. XLI. HAMMER-STONE AND CELT FOUND IN A MITLAN QUARRY.

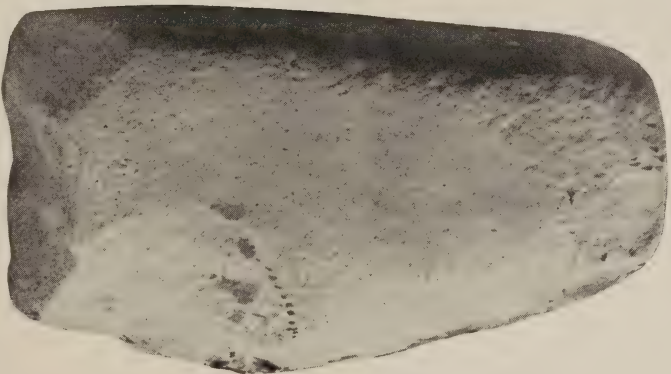
The large hammer-stone shown in *a* is made of trachyte by flaking, and is battered around the periphery indicating much use. It is identical in appearance with the flint-quarry hammer-stones of the United States. One-half actual size.

The celt or hatchet shown in *b* was found near the hewn stone in the quarry and may have been used in the work of shaping it. One-half actual size.



a

HAMMERSTONE AND CELT FOUND IN A MITLAN QUARRY. (ONE-HALF ACTUAL SIZE.)



b

outline in Fig. 103, and an average example, which I carried home, is presented in Pl. XL. As a matter of course all of these implements were hafted when in use.

A hammer-stone is given in Pl. XLI-*a*. I was so fortunate as to find on the slope, a few yards below the partially hewn block, a short, heavy, polished celt or adz of dark looking dioritic rock, Pl. XLI-*b*, which may have been used in the work, but the presence of so many of the ruder specimens makes it probable that they almost exclusively were used—at least in roughing out the blocks. Polished axes may have been employed in final stages of the cutting. Copper celts are found in Mitla, as in other places in Mexico and Yucatan, but it does not appear that they could have served any purpose in stone cutting, as the metal is too soft for effective execution. These celt forms were probably hafted, as are the modern iron celt-axes of Mitla, by being set in a socket in a hardwood handle.

FLAKED STONE IMPLEMENTS. It is an interesting circumstance that Mitla, whose architectural remains represent the most advanced neolithic culture, should furnish also plentiful traces of the practice of the simpler phases of art in stone. Flaked stones are found on all hands, and represent at least three distinct classes, (1) the picks and hammer-stones employed in the quarries for cutting out and rough dressing the great stones used in the buildings, (2) a very numerous class of flaked stones—cores, flakes and hammer-stones—found in and about the ruins, (3) the rejectage of flint blade making found on a shop site some distance west of the ruins.

The quarry implements have already been described and belong, without doubt, to the latest period of pre-Columbian occupation. Implements of the second group probably also belong to this period of building and are illustrated in Pls. XLII, XLIII and XLIV. They are distributed through the surface soil of Mitla and are found in great numbers in the cultivated fields bordering the stream above and below the village. They are generally formed of a coarse, yellowish, striped flint or flinty quartzite, and include (1) core-like forms from which the flakes have been struck, (2) the flakes struck off, and (3) the globular hammer-stones used in flaking and probably also in other shaping operations. The most remarkable fact relating to these flints is that they are found—especially the cores and flakes—in great numbers in the adobe mortar used in hearting the walls and pyramids of the great buildings of Mitla. It is not unusual to find the cores in nests of two, three or more, and a dozen may be seen in the crumbling wall of the Quadrangle of the Basement Galleries from a single point of view. The flakes and small fragments are much more

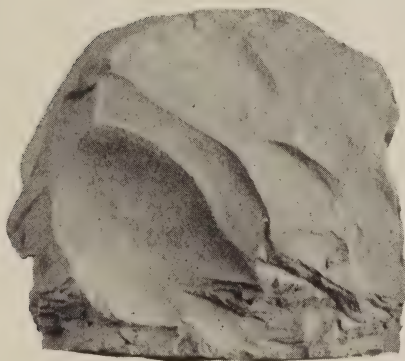
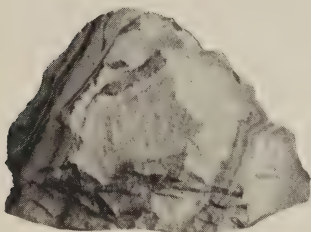
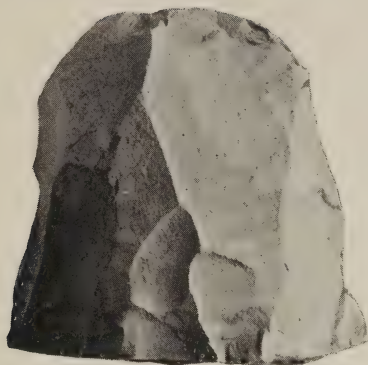
numerous, but do not, on account of their small size and lack of specialized shape, attract so much attention.

Certain questions arise with respect to the occurrence of these flints. First, are they in the soil as a result of operations carried on at some earlier period, making their association with the building purely adventitious? Second, were they or any of them made to be used in connection with cutting or dressing the stone for the buildings, thus, when discarded, becoming intermingled with the soil and with the adobe? Third, were the flints gathered and flaked to be added to the adobe for the purpose of increasing its durability? As yet I am not able to give satisfactory answers to these questions.

The stone used undoubtedly occurs in the neighborhood and in bodies sufficient to be quarried, or in surface masses so numerous as to be collected in considerable quantities. Its flaking qualities are not superior. The most striking of the shaped forms is the core or nucleus, examples of which are seen in Pl. XLII. They almost exactly duplicate the cores found in flint quarries of the United States, and are from 1 to 4 inches in diameter at the upper end, and generally somewhat conical below. In typical specimens the crown is circular and flat, and the sides are fluted as a result of the removal of successive flakes. In the plate the cores are shown in an inverted position.

The flakes associated with the cores or nuclei in the soil and in the adobe of the buildings are illustrated in Pl. XLIII. They show the usual features of nuclei-derived flakes—the faceted exterior, the conchoidal or flat back, the sharp lateral edges and the more or less acute point. One question that arises with respect to these objects is as to whether the cores alone were designed to be used or the flakes alone, or both. Examination of hundreds of the flakes indicates that few have been used, though rare specimens are chipped to a beveled edge at one side, as if for use as scrapers or chisels. The site furnishes no other implements, such as arrow-points, that could have been made from such flakes.

The most natural theory with respect to these flints is that since they are found so plentifully about the ancient building they were employed in the work of cutting stone. Possibly the flakes, set in handles, were used in the manner of the modern bush hammer. Possibly the cores were to be used in a similar manner. In support of the latter idea I may mention the fact that many of the cores show battered edges as if used in cutting or pecking operations; and it is also true that very many have been so much battered that the core form is lost, and they have become fully developed discoidal or



FLINT CORES, FROM WHICH FLAKES HAVE BEEN STRUCK OFF. (THREE-FOURTHS
ACTUAL SIZE.)



FLINT FLAKES AND SCRAPERS FROM MITLA. (THREE-FOURTHS ACTUAL SIZE.)



HAMMER-STONES FROM MITLA. (THREE-FOURTHS ACTUAL SIZE.)

globular hammer-stones. Typically developed hammer-stones are shown in Pl. XLIV. The fact that, with the exception of these objects, there are no implements in sight that could have been employed in the extensive work of dressing the stone employed in building tends to support the idea that they were really the sculpturing tools of the ancient builders.

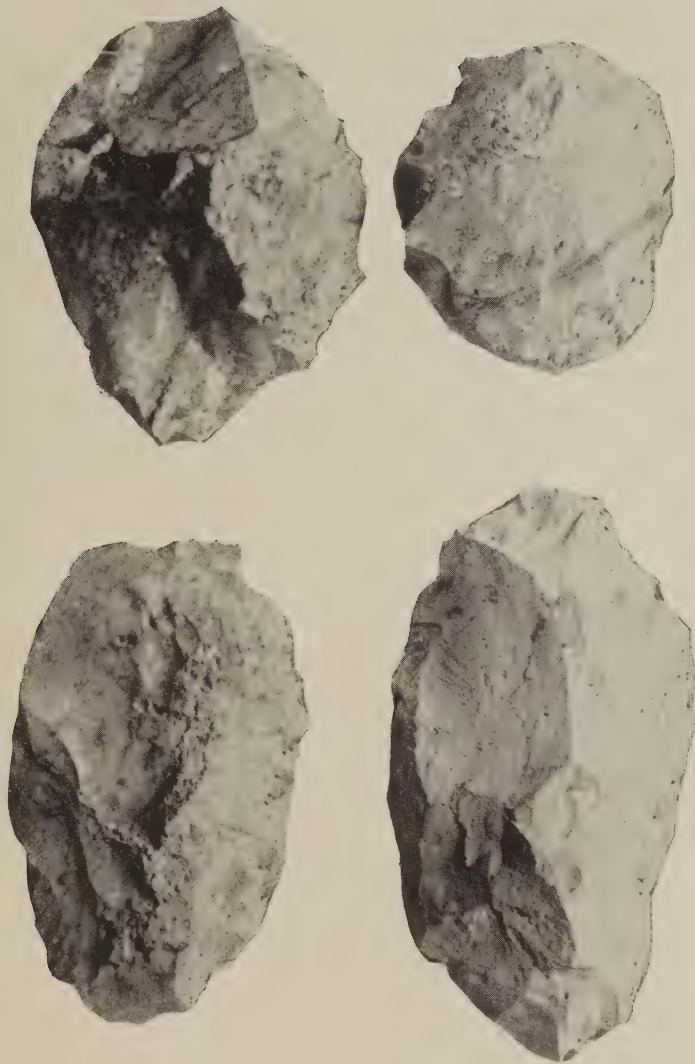
Flaked stones of the third variety do not occur in Mitla, but are found at the base of the fortified hill, a mile to the west. Descending from the hill by the long eastern spur, I came upon an excellent spring of water at the base, and about it encountered traces of flint flaking. The gentle slope east of the spring had recently been scratched with the plow, and the ground was filled with broken flint, generally of a grayish hue, and wholly distinct from the yellowish flinty rock worked elsewhere. Shop refuse occurred over the space of an acre or more, and the rejectage duplicated in every way that of the flint shops of the United States. I found but one hammer-stone, and that was imperfect; but there were many of the abortive, leaf-shape blades intermingled with the flakes and fragments, and specimens are shown in Pl. XLV. There was evidence of no other work than that of blade making, and it seems not improbable that this site was occupied by a people distinct from the builders of Mitla, or possibly by the Mitlan stock at an earlier period of its history. The slopes of the valley everywhere furnish bits of bright colored flint, and traces of working are encountered at every step, yet very few flaked implements are found, and I did not see a single well shaped arrow-point while in the valley of the Rio Mitla. Finely made flaked blades and specialized points are occasionally found, however, in the Oaxacan region.

COPPER IMPLEMENTS. Among the most characteristic of the Mitlan art remains are certain hatchet or tau-shaped objects of hammered copper found in very considerable numbers in graves, and possibly also in hoards or caches. Measured with the stem they vary from 4 to 7 inches in length, and the width across the blade is about the same. As the blades do not exceed one-tenth of an inch in thickness in any part, it is apparent that they could not have been employed as hatchets or chisels, although set in handles they would perhaps have served a good purpose as trowels, knives or scrapers. The generally accepted theory of their use is that they were the money of the ancients, or at least served as a standard of value. It may be remarked that the shape and tenuity suggest the possibility of their use as ornaments, and it appears that if well polished and set as a crowning feature in a helmet or head-dress, they would prove

very effective. Possibly, however, they were symbols and served some religious purpose.

The only other objects of copper that have come to my notice are a few celts or chisels of ordinary shape and size.

POTTERY. The ceramic art of the Oaxacan province presents many unique features and bears evidence of boldness and freedom in the manipulation of clay. There are vessels of almost every variety and form, but the genius of the potter was expended on a class of figurine vases often of large size and remarkable elaboration. The vessel—which always remained as a foundation or nucleus for the piece, though much subordinated—was faced or nearly covered with strange human figures decked in gaudy attire and loaded with extraordinary symbols. This ware was sometimes painted, but usually it is in the plain gray color of the baked clay; numerous fragments are found on most of the ancient sites, and our museums contain many handsome and perfectly preserved pieces. As I have in hand a special work on the Ceramic Art of Mexico, I shall not enter into a discussion of the subject in this place.



FLINT REJECTAGE OF BLADE MAKING FROM A SHOP NEAR MITLA.
ONE-HALF ACTUAL SIZE.

RUINS OF THE VALLEY OF MEXICO.

SAN JUAN TEOTIHUACAN.

RANK OF THE CITY. My two brief visits to the ancient city called San Juan Teotihuacan do not warrant an attempt at monographic treatment, but I may profitably present a panoramic view with brief descriptions, and a few paragraphs recording my impressions of this group of ruins. In the magnitude of its remains and in the evidence the site furnishes of population and antiquity, Teotihuacan stands easily at the head of the ancient cities of Mexico. It lacks the well-preserved, sculpture-decorated buildings found elsewhere in Mexico and Central America, but this is doubtless due to the rarity of suitable building stone in this part of the valley. The famous structures of Mitla, Palenque, Uxmal and Chichen-Itza, had they been built of such materials as are here available, would to-day be mere rounded heaps of debris. In dimensions, these cities in no way compare with the colossal piles of the chief city of the plateau. The bulk of the great cluster of pyramids, terraces and mounds is far in excess of that of any other group of remains. Cholula has a greater pyramid but lacks the multiplicity of attendant structures which at San Juan cover square miles of ground. If the entire mass of the ruined structures of either Chichen, Uxmal or Mitla was to be heaped up in a single mound, it would hardly surpass the great Pyramid of the Sun alone in bulk, and the whole bulk of the Teotihuacan remains is many times that of its chief pyramid.

HISTORY AND PEOPLE. Of the history of this great center of population and culture, we have hardly a trace save that furnished by the remains themselves. The building of the city has generally been attributed to the "Toltecs," but we cannot safely say more than that the builders were probably one of the numerous Nahuatl nations that for many centuries dominated the valley of Mexico. Though the name of the nation is not known, it is clear that the people, whatsoever their period or affinities, were intelligent, enterprising and powerful, and that their sway extended over a long period of years. The art remains indicate a culture differing decidedly from that of Tenochtitlan—the Aztec capital, now the capital city of Mexico—differing from

it in so many ways as to warrant the inference of a distinct nation; but at the same time the analogies are so close and numerous that the two peoples, if not of the same stock, must have been closely associated for a great number of years.

The nature and arrangement of the principal structures and features of the city would indicate the dominance of religious motives in their construction, and this, coupled with the well-known fact that ceremonial life among the native peoples in general was of vast importance, warrants the conclusion that Teotihuacan was in a sense a religious center; but it does not follow that any part of it may not have been devoted to secular uses, and it seems certain that, aside from the great central features, the city was largely one of residence, for there are here more decided and extensive traces of domestic architecture than in any other of the great cities of the country. It is noted that among all the monuments and relics of art there is a singular absence of indications of a warlike spirit, and, though it is next to impossible to think of a great American nation not built up and kept together on a military basis, the position of the place may have been so commanding as to raise it for a time above the level of ordinary strifes. It is probable that agriculture was the chief resource of the people, though many other arts and industries flourished.

LOCATION AND PLAN. The ruins are located 25 miles northeast of the City of Mexico, and occupy a gently sloping site in the midst of a broad fertile valley opening out to the southwest into the great basin of Lake Texcoco and to the northeast into the higher level plateaux. On the north the hills are near at hand, while on the south, as seen in the panorama, the cone-capped ridges are much farther off extending in a long line toward the southwest. In the laying out of Teotihuacan there is more evidence of foresight and system than in most of the ancient cities. Though the orientation is not accurate—the main features of the plan showing an error of about 15 degrees—the important features are arranged in more or less complete harmony and regularity about a great artery-like thoroughfare called the “Camino de los Muertos”—the “Pathway of the Dead.”

In matters of assemblage the analogies are closer with Monte Alban than with the other cities, though the contracted nature of the site of the latter did not permit the freedom of arrangement possible in San Juan. The greater courts, pyramids and groups of structures are surrounded by numerous inferior pyramids more or less symmetrical in placement, and throughout the wilderness of remains the quadrangular idea can be frequently recognized.

SUBSTRUCTURES. The two great pyramids stand in a class by themselves, entirely overshadowing the multitude of piles that cover the plain. These pyramids, as well as all other pyramidal masses, were probably substructures for buildings. All were truncated and ascended by stairways, and the sides of the loftier were generally terraced. In appearance nearly all resemble mere heaps of debris, for the superstructures have crumbled and buried the foundation masses, and these latter are much broken down about the summits, and often rendered unsymmetrical by modern excavation and the inroads of the plow and hoe; yet in very many cases the original rectangular outlines and flat tops are traceable, and in the panorama these features have been somewhat strengthened, thus expressing what is known through a close examination rather than what is seen from a distance through a veil of foliage and debris.

SUPERSTRUCTURES. All the loftier structures and those occupying elevated sites have entirely disappeared, as their exposed position has rendered them a quick prey to the agencies of destruction. But many lower level buildings, especially domiciliary structures, must

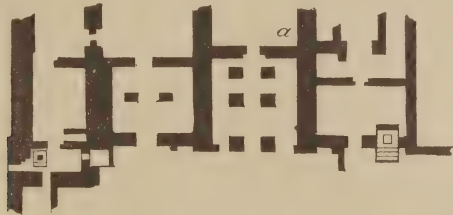


FIG. 104. PORTION OF GROUND-PLAN OF BUILDING UNCOVERED BY CHARNAY.

still be preserved beneath the debris, and the discoveries of Charnay and Batres, which have thrown light on many obscure points must in time be supplemented by other even more important revelations. The ground plan of the building disclosed by Charnay is highly complicated (Fig. 104), and shows a degree of specialization of apartments, passageways and courts entirely unknown in the southern and eastern cities.

All classes of structures were built of irregular masses and fragments of lava—gathered largely, no doubt, from the neighboring slopes and hills—and of adobe—the earth of the plains more or less intermingled with comminuted volcanic materials—obtained from the vicinity of the building sites. Construction was massive and strong, the adobe acting as a cement, but when the walls were neglected and

exposed to the elements disintegration was comparatively rapid. The exterior surfaces of the walls were carried up—in some cases at least—with a slight inward incline. It happens that none of the walls, so far uncovered, are preserved to their full height.

Facings of important surfaces were sometimes of selected stone. Hewn stone was little used, and the laying of regular courses in mortar was not common. All surfaces were evened up with mortar and finished in color; and some were decorated with mythologic as well as formal designs.

Details of construction are not well made out; doors were rectangular and comparatively plain; but no windows have been observed. It is believed that the roofs were flat and formed of wooden beams covered with thick layers of cement. Historic records show that this was true of the neighboring city of Texcoco, though drawings in the various codices indicate a preponderance of sloping roofs throughout Mexico. Where extended chamber space was required masonry pillars were built to support the beams. These pillars, as exposed by Charnay's excavations, were square and had inclined faces. Temple architecture must have presented many unique, handsome and possibly imposing features, and the indications are that dwellings—probably largely communal—were of a somewhat pretentious character.

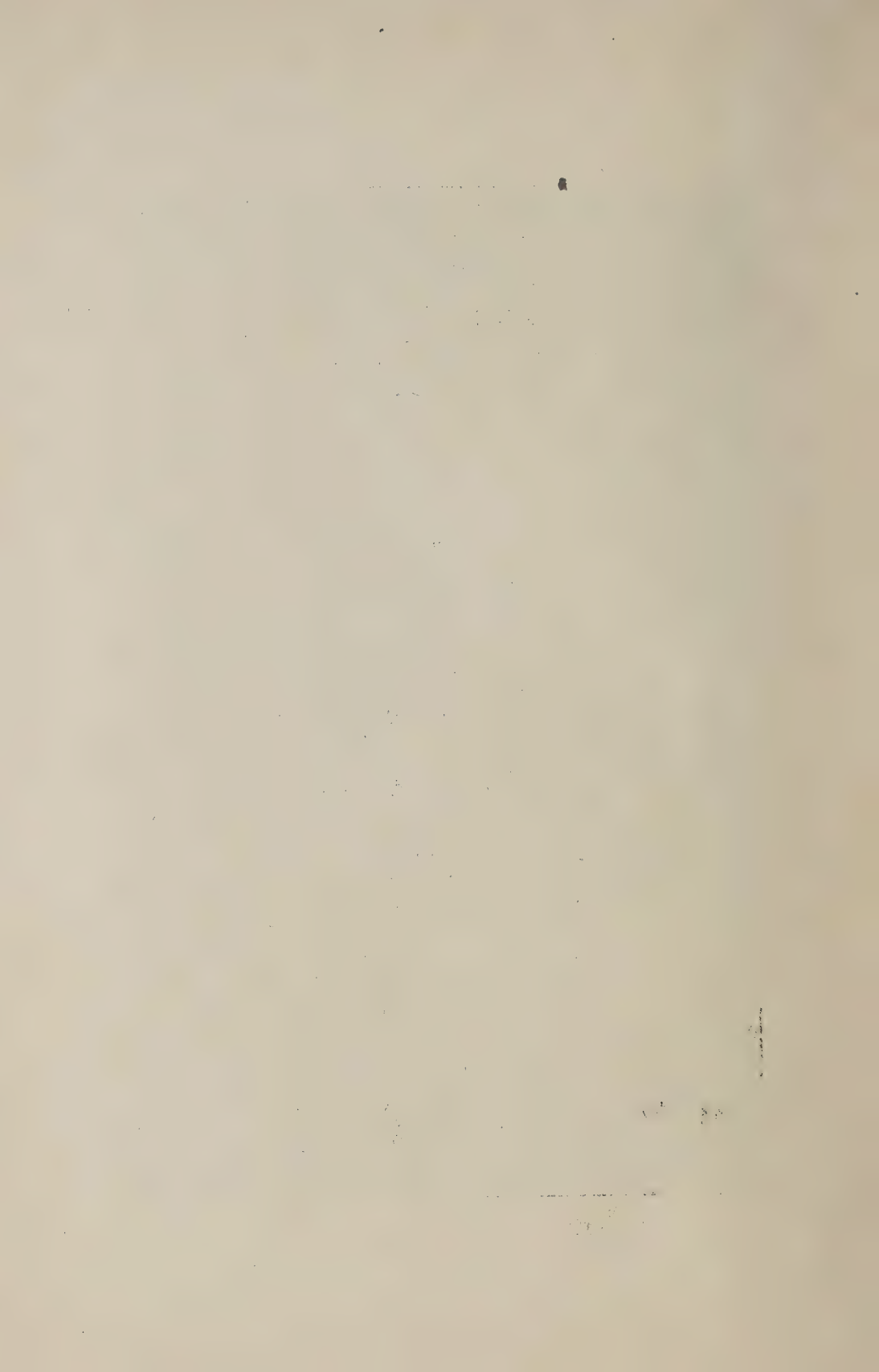
Among my photographs I find one, made by W. H. Jackson during our visit to San Juan in 1883, which represents the structure uncovered by Charnay in 1880. As this view seems to give a much more satisfactory idea of the remains than anything published by the explorer in his handsome work, it is perhaps advisable to reproduce it here (Pl. XLVI). In it we are looking toward the southeast across the great six-column chamber or hall from the point marked *a*, Fig. 104. The Pathway of the Dead passes to the left of the excavation, and is indicated by a line of dark trees. Beyond the Arroyo of the Rio San Juan—which is near at hand, though entirely hidden by foliage—and a little to the right of the middle of the picture, a glimpse is obtained of the pyramid which stands within the inclosure of the Citadel; and dimly shadowed forth in the far distance is the mountain mass seen to better advantage in the panorama. The floor of the house was evidently finished in white cement or plaster, and the six sloping pillar bases and the walls are likewise plastered. Charnay was unable to determine the nature of the upper part of the columns, but the walls are sufficiently well preserved to show that they, at least, were carried up perpendicularly to their full height. The columns were also probably continued in masonry, although timbers may have been used.

PL. XLVI. FOUNDATIONS EXPOSED BY CHARNAY'S EXCAVATIONS AT TEOTIHUACAN.

In the view we are looking to the southwest across the ruin of the large hall in which are the bases of six masonry columns supposed to have served in supporting the roof. The Pathway of the Dead passes obliquely across the picture just beyond the farther pair of column bases. Photograph by W. H. Jackson.



FOUNDATIONS EXPOSED BY CHARNAY'S EXCAVATIONS AT TEOTIHUACAN.



SCULPTURE. It is a remarkable fact that few elaborate sculptures have been found at Teotihuacan. The best known specimens are the two large idols in human form shown in Figs. 105 and 106. They are crude—even archaic—in their treatment. The serpent was a prominent subject here as elsewhere in Mexico, as indicated by several sculptures published by Charnay. Although many minor pieces exhibiting skill in carving have been found, there appears to be nothing to compare with the elaborate, highly finished and tasteful work of the great Aztec and Texcocan districts about the lakes. Stone implements are very numerous, and include hammer-stones, pestles, ribbed fiber beaters, obsidian knives, etc.

POTTERY. The potter's art was extensively practiced, and the site furnishes a greater variety of wares than any other in America. It is evident that a long period of occupation is represented. Vessels were of varied form, and range in treatment from the lowest limits of simplicity to the most elaborate phases of the native art. In the banks of the great Arroyo of the Rio San Juan I found fragments of vases corresponding in color and design with the remarkable butterfly vase preserved in the Museo Nacional—a piece of work rarely surpassed in America. The decoration of this vase is identical in general style with that of the owl fresco discovered and illustrated by Batres.* Dark, plain wares are plentiful, and resemble those of Texcoco, and the simple red wares of the Aztecs are found scattered about over the surface in many places. As a whole the San Juan wares are easily distinguished from those of Tenochtitlan. Two classes of objects are peculiar to this site—the little clay heads found in astounding numbers and variety, and the small cup-like objects suggesting candlesticks, the use of which is not finally settled.

The old Indian potter, who has supplied the museums of the world with imitation antiquities, is still at work in his little shop near the railway station in San Juan.

PAINTING. The paintings observed in the pottery and on the walls of houses recently uncovered are similar in style to examples observed elsewhere in Mexico, and are of the same general character and grade as those found in the various manuscripts preserved in the museums of Europe.

LITERATURE AND EXPLORATION. I will not attempt to review the literature of San Juan Teotihuacan or even to cull from it, for it is very voluminous and at the same time largely superficial and speculative. The Maximillian Commission, Charnay and Batres, have made beginnings in the grand work of systematic excavation—which alone

* Batres, Leopoldo: Teotihuacan. Mexico, 1889.

will disclose the limited range of facts still available to the historian. My remaining notes shall be devoted exclusively to giving an idea of the appearance of the ruins as a whole. The relations of the greater features to each other and to the natural features of the locality are seen to good advantage in the panorama.

PANORAMIC VIEW. The sketch for the view presented in Pl. XLIX was made from the summit of the Pyramid of the Moon and for the most part during the progress of a wind and rain storm, and is not accurate in all details. In making final drawing a point of view a little to the west of the summit of the Pyramid of the Moon was assumed. The latter monument is thus made to appear in its proper relation to its associates. It is unfortunate that the summit of the structure obscures to some extent its terraced south face and the mound lying near its southeastern corner; but all the great features of the site, five in number, are clearly brought out in the view. The Pyramid of the Moon occupies the immediate foreground, **A**. At the left, rising grandly above its cluster of terraces and attendant pyramids, is the Pyramid of the Sun, **B**. The pyramid-bordered Court of the Battered Goddess, **C**, appears behind the Pyramid of the Moon; and leading out of this and extending far away toward the south is the Pathway of the Dead, **D**; and beyond the Pyramid of the Sun, on the southern bank of the Arroyo of the Rio San Juan, is the noble group called the Citadel, **E**. The course of the Rio San Juan, which runs to the west—that is, to the right in the picture—is indicated by the letters **F**, **F**, and the Cathedral of the Village of San Juan appears at **G**.

Desiring that no wrong impression shall be conveyed by the panorama, which was hastily made, I reproduce in Pl. XLVII a photographic view from the summit of the Pyramid of the Moon. The object of the panoramic sketch is to give a map-like clearness and completeness to the view, while the photograph serves to record details of actual appearance. It should be observed, however, that the photographic view does not bring out the minor works to advantage, as they are obscured by culture features and rendered indistinct by defective light and shade, whereas the drawing slightly emphasizes or exaggerates the forms.

PYRAMID OF THE MOON. This imposing pile (**A**) is seen in the foreground of the panorama, and though now somewhat rounded in contour from crumbling above and accumulation of debris below, the original form was evidently that of a rectangular, truncated pyramid. The base of the mound measures about 450 feet from north to south and 500 feet from east to west; the truncated summit is not far

PL. XLVII. SAN JUAN TEOTIHUACAN FROM THE PYRAMID OF THE MOON.

In the foreground of this view we look down from the Pyramid of the Moon into the Court of the Battered Goddess, and beyond follow the Pathway of the Dead toward the south across the Rio San Juan. The great Pyramid of the Sun is at the left, and behind it in the midst of the plain the village of San Juan is indistinctly seen. Roadways and modern stone fences, separating land holdings, are a prominent feature of the view, while the numerous pyramidal piles bordering the Court and Pathway are unfortunately obscure.



SAN JUAN TEOTIHUACAN FROM THE PYRAMID OF THE MOON.

from 50 by 60 feet. The sides sloped originally at an angle of about 45 degrees, and were interrupted by narrow terraces now barely traceable. Early visitors mention the occurrence of remnants of a stairway on the east side, and indefinite references are made to a building on the summit. Against the base, on the south side, a platform-like projection is seen, now much modified in appearance by recent excavations and by the accumulation of debris from a tunnel carried into the middle of the face of the pyramid. Reports regarding the composition of the mass, derived from these excavations, indicate that the materials were probably obtained from the surrounding plain, mixed as adobe and added in more or less regular layers. The surface was faced in part if not wholly with unhewn or slightly dressed stone and finished presumably in plaster. The summit commands a splendid view of the ruin group, and in the palmy days of the great city the spectacle from this point must have been imposing indeed.

It would seem but natural, reasoning from analogy, that the summit temple faced the south, and that a wide stairway descended from the main portal to the court below.

PYRAMID OF THE SUN. This vast mound, B in the panorama, surrounded by its associated remains, is the most imposing structure in America. With its rounded outlines and the massiveness of a natural hill, it yet presents on close inspection clear indications of its former wholly artificial and symmetric character. It is a truncated pyramid, nearly 180 feet high above its immediate base, and perhaps a little more than that above the floor of the Pathway of the Dead, or the general level of the plain. It is about 700 feet square at the base, though the measurements given are hardly more than estimates, as the lower parts are covered with vast accumulations of debris. The slopes did not vary greatly from 45 degrees, though now appearing much less than that. Terraces are still seen at three levels; that on the west side, facing the Pathway of the Dead, occurs nearly midway in the slope and is between 20 and 30 feet wide; the others are quite narrow. The summit is not far from 100 feet square, but is now too much broken down to be accurately measured. Remains of a zigzag stairway are said to have been observed on the east face, but as with the other pyramid, analogy would lead to the surmise that the real stairway was on the west side, thus giving a more direct descent from the summit temple, which we assume must have existed, to the great central artery of the city.

The facing of selected and in cases roughly dressed stones is seen in place at several points, and the interior of the mass is of irregular deposits of earth and stones, much as in the other mounds.

The much broken terrace or embankment surrounding the base of this pyramid is something like 200 feet wide on the north, south and east, and somewhat less than this on the west facing the roadway where it connects with the terraces and pyramid masses extending to the north and south. The outer margin is a little higher than the inner space next the pyramid, and was occupied, as in the Citadel group to the south, by lines of small pyramids now nearly obliterated by the plow. The suggestion afforded by the group as a whole is that of an inclosed court, the central structure in which has developed by degrees to occupy nearly the entire space.

COURT OF THE BATTERED GODDESS. An important feature of the ancient city was the great court (C) lying at the south base of the Pyramid of the Moon and opening into the Pathway of the Dead. It is 600 or 700 feet square and is surrounded by a line of imposing mounds, above which on the north towers the Pyramid of the Moon. Near the center is a low mound, the wreck of an



FIG. 105. MUTILATED FIGURE OF A DEITY. HEIGHT, 6 FEET.

inferior pyramid, whose position would indicate that in former days it probably had an important part to play in the affairs of the city. Not far from its south base is the overthrown and much mutilated figure of a goddess, described in a former paper* and illustrated in Fig. 105. On the west side of the court, behind the first line of mounds, was found the large idol recently removed to the Museo Nacional; it also is described in the above mentioned paper, and is here shown in Fig. 106.

CAMINO DE LOS MUERTOS. Opening out of the great court to the south is the so-called "Pathway of the Dead" (D), a depressed way varying from 200 to 300 feet in width and extending a little west of south (15 degrees) to the Arroyo of the Rio San Juan and continuing beyond into the fields surrounding the modern village, a distance of

* Monoliths of the San Juan Teotihuacan. *American Journal of Archaeology*, Vol. I, No. 4.

PL. XLVIII. VIEW LOOKING EAST ALONG THE PATHWAY OF THE DEAD.

The point of view is in the middle of the Pathway opposite the Pyramid of the Sun, which structure is beyond the limits of the picture at the right. The modern stone fence running along the middle of the Pathway is also seen in the view looking in the opposite direction from the Pyramid of the Moon, Pl. XLVII. This pyramid is seen in the distance. At the sides of the Pathway are lines of rounded mounds representing the ancient structures. Photograph by W. H. Jackson.



VIEW LOOKING EAST ALONG THE PATHWAY OF THE DEAD.

nearly two miles. Though this pyramid-bordered way presents the appearance of a roadway, it is not truly a thoroughfare, being crossed by low embankments and interrupted by pyramids at several points. The name given appears to have no particular significance, yet it



FIG. 106. FIGURE OF A DEITY. HEIGHT, 11 FEET.

serves in a way to express the idea, suggested to all minds, that this Pathway, in connection with the court, must have been the scene of no end of rites and pageants in which human sacrifice was possibly a central feature.

The pyramids, mounds and terraces, ranged in almost unbroken lines along the Camino, rise to a height of from 10 to 30 feet (Pl. XLVIII), and behind these front tiers, on the east and west, are innumerable piles, quadrangular or irregular in arrangement; and isolated remains extend far out over the plain, reaching San Martin on the northeast and San Juan on the south. The panorama can only suggest the multitude of remains, as the eye fails to clearly perceive, even with the aid of the field glass, forms so reduced by the plow and so obscured by crops and foliage.

THE SOUTH SIDE GROUP OR CITADEL. The Arroyo of the San Juan was undoubtedly bridged at the crossing of the Pathway of the Dead, thus connecting the north with the south side. The great quadrangular group named the Citadel (E) lies on the east side of the

Pathway, 500 or 600 feet south of the banks of the Arroyo. It consists of a rectangular inclosure about 1,350 by 1,400 feet in extent, measured around the exterior base. The embankment is from 100 to 180 feet wide and from 10 to 20 feet in height. The four sides are surmounted by lines of mounds, four on a side, placed somewhat unsymmetrically near the outer margin. Within the court near the east side stands a pyramid, perhaps 200 feet square at the base and 60 feet high, having a projection or terrace built against the west base, while low embankments extend north and south from the pyramid connecting it with the inclosing ridge. A small pyramid stands quite alone a little to the north of the center of the inclosure. This grand group of structures is in an advanced state of ruin, the crumbling piles having been reduced to natural profiles by centuries of cultivation and herding, and no traces of the superstructures which must once have crowned the pyramids are now to be seen. Everywhere there are signs of ancient occupation; and systematic excavation on the site will certainly repay the explorer who may be so fortunate as to undertake the work.

TENOCHTITLAN—CITY OF MEXICO.

The Aztec capital, Tenochtitlan or Mexatl, was situated on the southwest shore of Lake Texcoco, in the Valley of Mexico, and was overthrown and practically destroyed by Cortez in 1521. This latter event may well be deplored by archeologists, for they have thus one less ruined city to explore, yet there is compensation in the fact that history has been enriched by the chronicles of the destroyers who built their capital on the site. Although all structures of importance were leveled with the ground, modern excavation brings to light many traces of the ancient time—foundations, sculptures, pottery, and deposits of refuse accumulated during the long period of Aztec and possibly pre-Aztec occupation.

I desire to do nothing more here than call attention to what is to me one of the most striking and wonderful features of the ancient remains of the Valley—the accumulation of refuse in several sections of the city, and especially in those parts now known as Nonoalco, San Simon and Santiago Tlalteluco, and which comprise a district extending from the Mexican Central Railway station two or three miles toward the northeast.

On a former occasion I made limited studies of these deposits, and some of the results are recorded in a paper published in the Trans-



D. Pathway of the D

G. Location of San Juan Village.

EW OF SAN JUAN
LOOKING SOUTH.



A. Pyramid of the Moon.

B. Pyramid of the Sun.

C. Court of the Battered Goddess.

D. Pathway of the Dead.

E. Citadel.

F, F. Course of Rio San Juan.

G. Location of San Juan Village.

PANORAMIC VIEW OF SAN JUAN TEOTIHUACAN.
LOOKING SOUTH.

actions of the Anthropological Society of Washington* for 1885. My recent visit, made under the guidance of Mr. E. O. Matthews, extended over a wider area and brought to light far more extensive remains. In some of the fields where excavations of the soil for brick-making are going on, sections are exposed to the depth of 18 or 20 feet, and the entire body of deposits seems filled with the refuse of dwelling. In places the broken pottery is so abundant as to make up at least one-fourth of the mass. The prevailing variety of ware is extremely rude, and consists of simple cups and bowls with textile marked surfaces, with roughly shaped, slightly thickened rims and narrow, flattish bottoms. Mingled with these deposits are fragments of better made wares, with polished and painted surfaces, and near the top are countless numbers of broken and occasionally unbroken vases of the well identified Aztec types. Objects of various other classes are included, but pottery prevails to such an extent that it seems reasonable to suppose that here the ancient potters carried on their art, or that here were located the markets where from generation to generation the various food products of the valley were brought to be sold or prepared for consumption. Possibly this was the flower market where the gardeners of the "floating islands" and the extensive lake shores landed with their boats, using these rude, fragile vessels to transport and keep fresh the flowers of which the ancient natives are said to have been fond. It seems probable that a systematic study of these deposits would yield much valuable information respecting the culture status of the successive occupants of the valley, and it is much to be regretted that the work cannot be taken up by competent observers.

* Vol. III., pp. 68-81.

STUDIES OF ANCIENT MEXICAN SCULPTURE.

Yucatan and the southern states of Mexico are not rich in important sculptures aside from those embodied in architectural embellishment. It is quite different with the Valley of Mexico and adjacent sections of the great plateau, where large numbers of interesting and often elaborate and highly finished objects are brought to light from year to year. A survey of these sculptures shows that they served a multitude of purposes, that they cover a wide range of subject matter, and illustrate various styles of treatment and methods of execution. All, however, come well within the culture limitations of the historic nations of the province.

Among the more important classes of subjects independently sculptured are the human figure—entire or in part; animal forms—entire or in part; and compound and fanciful life-form conceptions of endless variety; these subjects are embodied also in masks, collars, tablets, calendars, cylinders, disks, boxes, vases and ornaments. The animal kingdom furnishes a vast majority of the motives, and every department is represented, mammals, birds, fishes, reptiles, insects and mollusks. Vegetal forms, though much employed by the Nahuatl painter, had little place in sculpture.

The Nahuatl lapidary was favored by nature in having at hand many varieties of workable and beautiful stone, and was thus encouraged to elaborate form and refine finish; whereas the Mayas had, in the main, only limestone, and this of a variety not well adapted to refined, æsthetic treatment. These conditions account, at least in part, for the greater diversity and beauty of non-architectural Nahuatl sculpture. A partial list of the stones used in the Valley of Mexico and the neighboring areas is as follows: onyx, marble, limestone, quartz and quartz crystal, granite, syenite, basalt, trachyte, rhyolite, diorite and obsidian. It is a noteworthy fact that the shaping of these varied materials required a wide range of technical resources, one nearly or quite equaling that employed by civilized nations, although devices were elementary and the peoples concerned were yet within the narrow confines of the stone age; stone was used to shape stone, save of course in cases where appliances for drilling, sawing and grinding involved the use of materials softer than those worked—such as wood, bone or native metal.

With the ancient Mexicans, as with all stone working nations, the shaping of brittle materials was accomplished by fracture processes—breaking, flaking and chipping; the tough, hard materials were reduced by battering processes—picking, pecking, percussion drilling, etc.; while the abrading processes—sawing, rotary drilling, grinding and polishing were employed according to the requirements of the shaping work; and incising methods served where the stone shaped was sufficiently soft to permit of their use.

The form of sculpture varies from the merest line engraving through all grades of low and high relief to the full round. The treatment has to do largely with surfaces rather than with absolute realistic forms, and the figure of the man is often a mere block with sculptured surface features, and the animal is worked out upon the surface of some boulder or slightly modified natural mass. Sculptures embellishing objects of use are necessarily largely in low relief.

So far as the art displayed in these sculptures, aside from that of the mere stone cutter and lapidary, is concerned, there is nothing very remarkable, especially when we come to consider the commanding position of the Nahuatl peoples among the American nations. Proportion is not more correct, and expression is not more life-like than among numerous nations scattered along from Alaska to Argentine. In fact there is little in Mexico that can boast of a higher place in art—that exhibits more boldness and freedom of handling—than the strange carvings in both stone and wood of the primitive tribes of the Northwest Coast. It may not be quite fair, however, to compare carvings made by a modern people possessed of metal implements with works in stone of a stone-age people. The writings of the conquerors of Mexico make frequent mention of elaborately carved idols in wood, and such examples of ancient Mexican wood carving as have been preserved, display very decided skill. The latter are in the main reliefs, and the zapote-wood altar panel in the Temple of the Sun at Tikal, Guatemala,* is perhaps the finest specimen of sculptured relief yet brought to light in America.

In sculpture in the round, these plateau peoples seldom rose above the making of single figures, and these rarely reach any considerable degree of realism. True proportion was not appreciated, or was very generally disregarded, and this is true also of most of their relief and graphic work, as illustrated in the "Tizoc" stone and in the remarkable depictions of the codices; but in the Usumacinta province figures in stucco and stone are often in excellent proportion, as, for example, at Palenque on the pier fronts of the

* Charnay, *Ancient Cities*, p. 467.

Palace, in the stucco altar piece of the Temple of the Beau Relief and in the limestone tablets of the Temples of the Cross and Sun. In Palenque a good deal of skill and taste are shown in the grouping of two or more figures within a panel, these efforts at composition giving decided indications of advance toward higher planes of artistic development.

It is safe to say of Nahuatl sculpture, and of all other native sculpture for that matter, that it is largely of religious inspiration. Portraiture had not risen to a place of importance, and the æsthetic, though pervading everything, was not divorced from the symbolic. Whatever there is of grace and symmetry of form, whatever of elaboration and refinement of finish was, first of all, a tribute to the mysterious forces of nature personified in the various forms sculptured. Yet the influence of æsthetic notions was all-pervading; plain blunt statement was not enough; there was keen appreciation of the qualities of form regarded with favor by the highly cultured eye of the civilized world. In no group of works is this more apparent than in the realizations of the feathered serpent concept, where every line of head, body and feather embellishment is bold, graceful and telling. The exercise of taste is equally apparent in subjects where conventional decorative effects are secured by modifications and rhythmic repetitions of the parts of creatures embodied, as in the animal elements embellishing the curious stone yokes shown in illustrations accompanying this section.

Surface finish is no less a test of the æsthetic appreciations of the ancient sculptor. The harder stones were polished to the highest degree possible, while those not susceptible of such polish were finished in surface applications of fine clay or cement, which were colored and polished; and so thoroughly was the latter work done that many pieces still retain the enamel-like coatings. This application of color extended also to architectural sculptures and surfaces.

Among the monolithic sculptures of the Nahuatl province there are no works so colossal, so noble, so imbued with æsthetic feeling as are the great monoliths of Guatemala and Honduras; but considering all points I am inclined to place the compound deity ‘Huitzilopochtli-Teoyaomiqui’ of the Museo Nacional, brutal and terrible as it is, very close to the head of the American list. Certainly, in their respective classes, the so-called calendar-stone and the great ‘Tizoc’ disk outrank all others; and some minor sculptures, such as the polished diorite head of ‘Centeotl’ or ‘Totec’ in the Museo Nacional, are without rivals. However, when we come to look over the whole field of American sculptural achievement, architectural as well as non-archi-

tectural, composite and monolithic, we are forced to concede the palm for boldness of conception, for magnitude of proportions and infinity of labor involved, to the sculpture mosaics of Yucatan.

The minor works of sculpture, to which class the objects to be described in the following pages belong, are largely without pedigree; they are not definitely associated with any particular people or culture group, save in a most general way; many are absolute strays, picked up here and there without record of circumstance of discovery, and acquired by travelers and collectors and distributed to all parts of the civilized world. There is no possibility of future assemblage of these objects in any one place, and it must be regarded as in a sense the duty of all owners and custodians of such treasures to give them publicity—to publish descriptions and illustrations so that they may as soon as possible be the common property of those who are to write the history of the race and its art; and, what is also of much importance, that they may have the chance to gather about themselves such items of information as to origin as may accrue through publicity. In issuing the following brief descriptions of the sculptures that have come within my reach I aim at little more than to place the pieces illustrated within the reach of students. Critical and comparative studies of form, decoration and symbolism cannot be successfully conducted without full access to the literature of the subject, and without more complete and comprehensive collections than have yet been brought together. Publication of adequate descriptions of the specimens, along with proper illustrations, practically places them in all the museums, as well as in all the libraries, of the world.

ONYX TABLET WITH ENGRAVED FIGURE OF A DEITY. About the year 1895 there was brought to light by workmen digging an irrigating canal at Ixtapaluco, near Chalco, in the Valley of Mexico, an

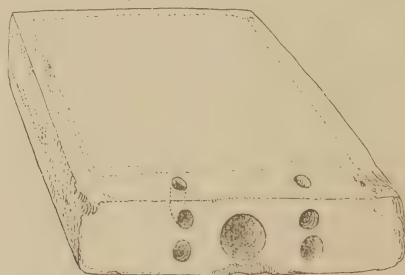


FIG. 107. PERFORATIONS IN UPPER END OF ONYX TABLET.

engraved tablet of remarkable character and, as it happens, of unique interest. It is a keystone shaped slab of onyx, $11\frac{1}{2}$ inches long, $6\frac{1}{2}$

inches wide at the wider end, and $1\frac{1}{2}$ inches thick; it is drilled longitudinally and has four pairs of biconical perforations along the upper margin. Although it seems that its size would have precluded its use as a pendant, the marginal perforations are just such as are found in pendant ornaments, and it may be that this specimen was actually used on ceremonial occasions of exceptional importance; or it may have been intended for suspension on the breast of some idol. The position of the several perforations is indicated in Fig. 107.



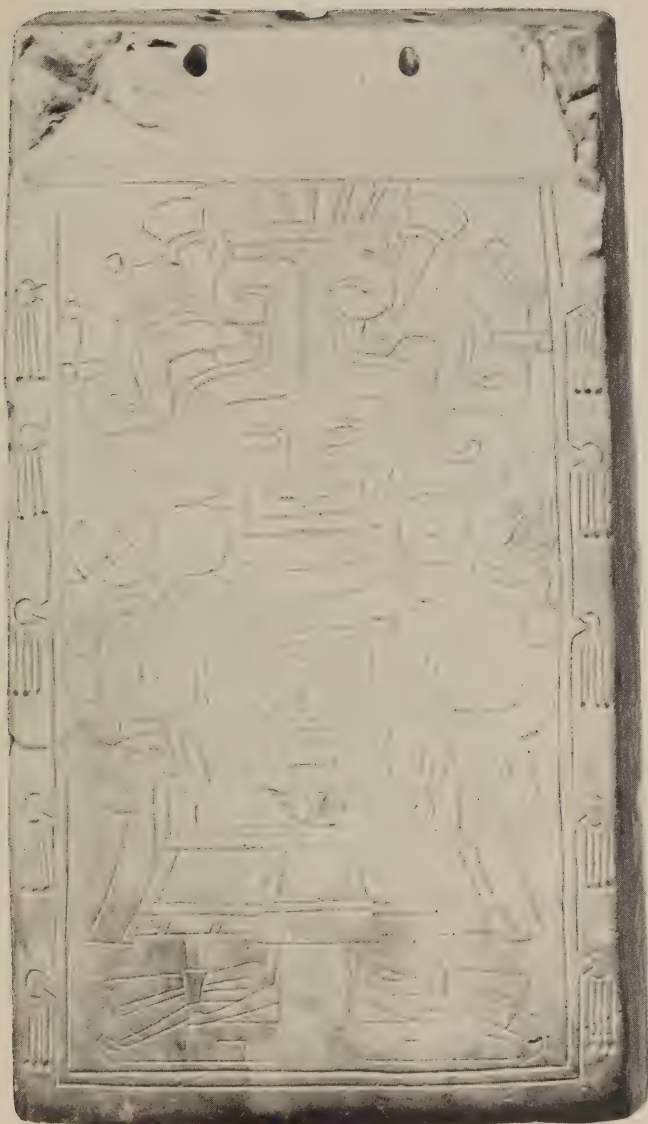
FIG. 108. ENGRAVED FIGURE OF DEITY FROM ONYX TABLET. ONE-HALF ACTUAL SIZE.

The engraved design is highly interesting and imparts much value to the stone, but the most important feature of the specimen was not discovered until after its arrival in Chicago. When taken from the box in which it had been carefully packed, it was found to be broken

directly across the face. The owner was naturally very much distressed by this occurrence, as the value of the specimen was apparently much impaired. Picking up the smaller fragment I proceeded to examine the longitudinal perforation exposed in section by the fracture, and to my surprise found the end of a tubular bone projecting from the opening. The conclusion was at once reached that this was the drill used in boring the perforation, and the value of the specimen was at once more than doubled. Fortunately, through the generosity of Mr. Armour, this tablet was secured for the Museum. It is made of pale-green, translucent onyx, somewhat laminated at the back where there is a layer of opaque whitish stone. The surfaces are well polished, and the front is occupied by a figure, which I take to represent some Nahuatl deity, engraved in sharp, shallow lines and with much skill and precision. The figure is framed in with a border consisting of a single heavy line and, at the sides and bottom, a second line outside of the first to which, at the right and left, are attached what appear to be representations of pendant tassels. The tablet is shown in Pl. L, and the engraved figure, traced from a rubbing, appears in Fig. 108.

The deity stands in formal fashion, full front view, with hands uplifted and feet turned out. The head is large and the body short—as is usual in works of this class—yet the whole figure is clearly and fully expressed, and with a minimum number of lines, selected and used with the skill of a master. The eyes are oval and the pupils are emphasized by means of scratched lines. The brows, nose and nostrils are expressed by a single continuous line; the mouth is covered with an angular device apparently suspended from the nose ornament. The latter is a bar bent up at the end connecting with lines which cross the cheeks horizontally and descend in zigzag fashion to the ears, or rather to the large discs with which the ears are embellished.

The head-dress is at once striking and interesting. It is strongly drawn, and consists exclusively of two highly conventionalized, but clearly expressed feathered serpents, whose bodies are joined above and terminate in a double row of feathers (representing the tails) against the upper margin of the tablet. The serpent bodies part over the forehead, descend at the sides of the face, and curve out over the ears in strong coils which represent the under jaws of the reptiles. The upper jaw is represented in each case by a similar strongly curved band which extends back over the head and incloses the eye; while above rises a formal feathered crown, and back of this, and forming a strong feature of the design, is a wand-like figure representing a rigid



ONYX TABLET WITH ENGRAVED FIGURE OF A DEITY. ONE-HALF ACTUAL SIZE.

plume or horn. The chin is encircled by the usual formal necklace with pendants, below which is a strongly drawn device crossing the chest and terminating against the margins of the tablet. It is clear that this device is neither more nor less than a condensed presentation of the twin serpent concept; the center piece consists of an eye and a single two-band coil, standing for the head or heads, while the bodies terminate at the right and left in feather-tipped coils. In this device, as well as in the head-dress, the designer has displayed great cleverness in simplifying the serpent forms to accommodate them to the space and use, but the convention has not proceeded so far as to entirely destroy continuity and normal relations of parts.

The belt, which is tied with a loop at the sides, and the short skirt below, are formally treated, the former exhibiting details—worked out in angular lines—that probably had some particular significance to the designer. The hands, with thumb turned back and index finger pointed upwards, appear at the sides. The ankles display conventionalized ties, and the feet, covered behind by pendant flaps, terminate each in a single great toe.

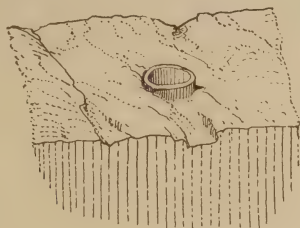


FIG. 109. BONE DRILL AS IT APPEARED IN THE BROKEN TABLET.

Proceeding to an examination of the drilled holes and the supposed bone drill, I first examined and sketched the projecting implement, which appeared as shown in Fig. 109.

Pouring water into the perforation to dampen the dark earth that clung to the sides and served to fix the bone tube in its place, I was at once able to press the implement back into the stone and, as the other end of the opening was larger, to remove it with ease. The finely comminuted earth was carefully saved for examination under the microscope. The hollow bone, Fig. 110-a, probably from the leg of a crane or other large bird, is $2\frac{3}{4}$ inches long and $\frac{3}{8}$ of an inch in diameter. It is shattered and worn at the upper end, while the lower end or point has the appearance of having been freshly cut off. This latter feature was a matter of some surprise, as a drill point might be expected to show decided evidence of abrasion by use. I found, however, on the other hand, that the exterior surface of the tube

was scratched and striated as if by attrition with fine sand. On washing out the bore in the larger piece of stone, I discovered that the bone tube had not extended to the end of the boring from below, that in fact it reached only half way, and that the size of the hole diminished so that it could not enter farther. On cleaning out the earth the fact was developed that the borings from opposite ends of the tablet had not met accurately, as indicated in Fig. 110-*b*, and the conclusion was at once reached that the drill was probably being employed, when the work ceased, to enlarge the bore, with the intention of making more complete connection from end to end.

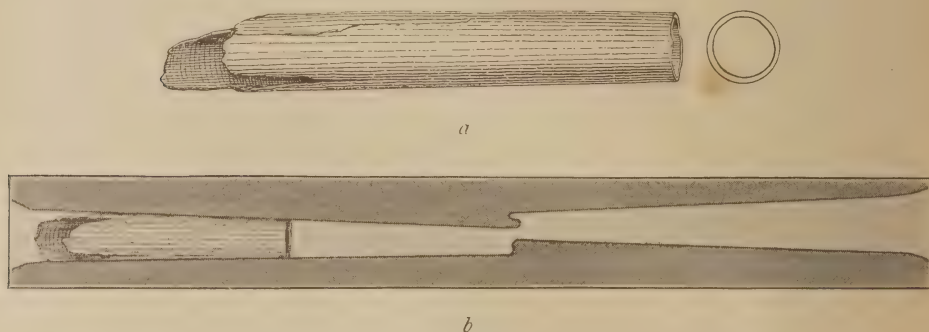


FIG. 110. BONE DRILL USED IN PERFORATING ONYX TABLET.

- a.* Bone drill, with section; actual size.
b. Section of tablet showing position of drill. Lower end of tablet at the left.

The use of the tubular drill of cane, bone or native metal by primitive peoples, and even by many well advanced nations, is well known. The tube was twirled by rolling between the hands, or by a pump or bow drill, and sand of suitable fineness and hardness was employed as the cutting agent. That a tubular drill was used in the present case is proved by the presence of a well developed core at the base of the boring from the upper end, as shown in the drawing. Fig. 110-*b*; and, though the proof may not be absolute that this piece of bone was actually in use as a drill, the probabilities are strongly in favor of the correctness of the assumption that it was so used, and it is also highly probable that in addition we have here a correct suggestion of the manner in which the tubular drill was employed in enlarging and straightening defective borings, a measure often necessary where devices were of such imperfect construction.

The sand obtained from the boring in and about the bone tube was submitted to Prof. O. C. Farrington, curator of geology, who kindly furnished the following report:

"The material submitted to me for examination was about $\frac{1}{10}$ of

a gram of a gray powder, mingled with a number of splinters of bone 2 or 3 mm. long, and coarse, rounded grains, 1 mm. in diameter, of a gray porous rock. Under the microscope the powder was seen to be made up of grains of various shapes and sizes from 8 mm. in diameter down. Most of these grains had sharp, angular surfaces and gave little evidence of wear. There were, however, a number of rounded white grains about 1 mm. in diameter. These effervesced, and were decomposed by both hydrochloric and sulphuric acid, giving crystals of gypsum with the latter. Some of these were identified by their porous structure as partly decomposed bone, while others seemed to be travertine. A few transparent grains were positively identified by their high double refraction as calcite. Other grains of the powder were black and opaque, and still others dark and translucent. The latter were isotropic, indicating that they were probably a volcanic glass. Some of the grains were attracted by a magnet, but no distinct particles of magnetite could be identified. By rubbing the powder with a pine stick on a surface of glass, the glass was perceptibly scratched, some grains cutting deeper than others. Slight scratches were also produced on a quartz crystal by the same treatment, indicating that some particles had a hardness of 7. The appearance and physical properties of the powder lead me to regard it as one produced by the disintegration of a volcanic rock, such as an andesite.

"The hardness of the grains is such as to make them a fairly good abrasive for a rock as soft as travertine, but there seems to have been in point of size or quality of the grains no special selection for this purpose."

SCULPTURED YOKES. Two examples of the handsomely sculptured objects, commonly classed as "sacrificial yokes," have recently come into possession of the Museum. One of these, illustrated in Fig. 111, is of the usual type, open at the base like a horseshoe, and forming an arch when set on end.* It is 15½ inches in height (length), and 14½ inches in greatest width. In section the inner surface is straight and the outer surface rounded, as shown in *a*, Fig. 116. The thickness from inner to outer surface is about 3½ inches, and from face to back, 4½ inches. The stone is a dark, greenish gray, very compact chlorite, and the surface is well and evenly polished. The carving is simple, and evidently incomplete; the form embodied, so far as it goes, is that of a frog or toad. The hind legs appear at the base of the arms of the yoke; the rounded body occupies the middle

* It may be well to state in this place that the normal position of these objects, when at rest—probably the position also when in actual use—is prostrate, and not erect as an arch.

of the sides, and the fore legs are partially defined at the spring of the arch; while the curve of the arch—usually, in similar yokes, carved on the upper surfaces to represent the reptilian head—is quite plain. The reverse or under face, which is somewhat narrower than the obverse



FIG. 111. YOKE OF CHLORITE, WITH PARTIALLY DEVELOPED FIGURE OF THE FROG.
FROM MOTZORONGO, STATE OF VERA CRUZ.

or upper (front) face, is also without carving. A more fully developed example of the same class of yoke is shown in Pl. LI. In this specimen the crown of the arch is carved to represent the reptile's face—illustrated in *a*. A face view of the yoke is given in *b*, and a side view, with the head of the reptile at the left, appears in *c*. In other yokes of this particular type the reptilian features are still more fully elaborated and realistic, while in others still the treatment is highly conventional and decorative. The reptilian motive is also, at times, combined with other concepts, as the bird and the man, indicating complexity of symbolism.

The second specimen, illustrated in Pl. LII, is a unique and remarkable work, and certainly one of the most elaborately and artistically embellished yokes yet brought to light. The material is a hornblende



STONE YOKE CARVED TO REPRESENT A FROG. ABOUT ONE-FOURTH ACTUAL SIZE.

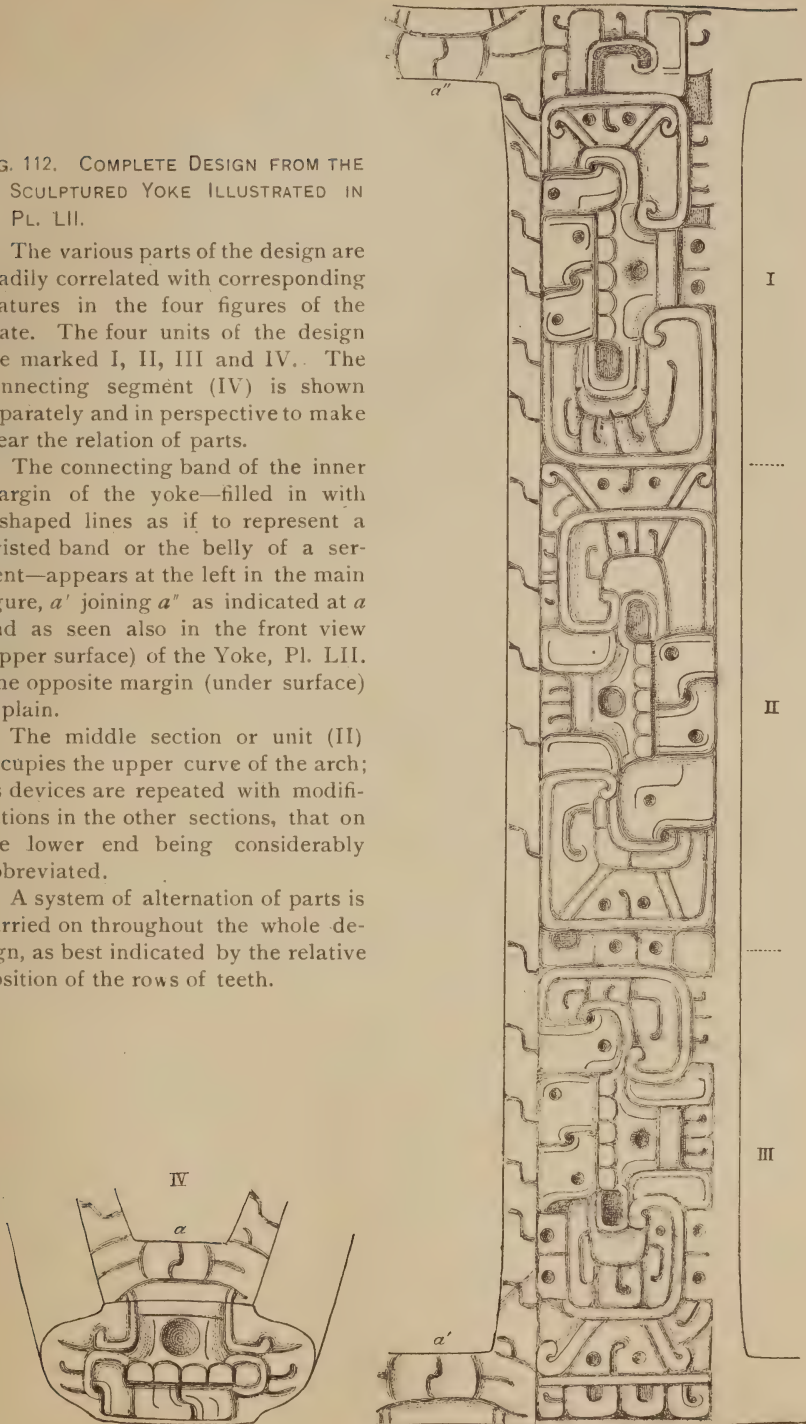
FIG. 112. COMPLETE DESIGN FROM THE
SCULPTURED YOKE ILLUSTRATED IN
PL. LII.

The various parts of the design are readily correlated with corresponding features in the four figures of the plate. The four units of the design are marked I, II, III and IV. The connecting segment (IV) is shown separately and in perspective to make clear the relation of parts.

The connecting band of the inner margin of the yoke—filled in with S-shaped lines as if to represent a twisted band or the belly of a serpent—appears at the left in the main figure, *a'* joining *a''* as indicated at *a* and as seen also in the front view (upper surface) of the Yoke, Pl. LII. The opposite margin (under surface) is plain.

The middle section or unit (II) occupies the upper curve of the arch; its devices are repeated with modifications in the other sections, that on the lower end being considerably abbreviated.

A system of alternation of parts is carried on throughout the whole design, as best indicated by the relative position of the rows of teeth.



andesite, showing numerous angular fragments included in the light grayish-green matrix. It is unique in being closed at the base, and in its striking approximation to a common leathern horse-collar in appearance. It is slightly larger than the average yoke, measuring $21\frac{1}{2}$ inches in height (or length) and $15\frac{1}{2}$ inches in greatest width. The thickness, from face to back, on the inner margin, is 4 inches, and the distance through, from inner to outer surface, is about $3\frac{1}{2}$ inches, save at the base or narrow end, where the connecting segment—flat on both faces and slightly incurved on the end surface—is but $2\frac{1}{2}$ inches in thickness. The section of the connecting segment is rectangular; that of the arch is straight on the inside, and approximates a semi-circle on the outer surface (*b*, Fig. 116). The flat inner surface is entirely even and symmetric, but is not polished; the exterior surface, save a narrow, inner, marginal band on the under side, is covered with relief carvings, and with the exception of the deeper depressions, is highly polished.

It is fully apparent that the carvings of the exterior surface of this yoke embody animal motives, but they are very highly conventionalized, and I may add, are of an order of elaboration both surprising and admirable. There is not an animal feature recognizable to the inexperienced eye, yet to those in a measure initiated into the mysteries of native American conventional art, there is no part that is not certainly representative and significant. All the features are well brought out in the four views assembled in Pl. LII, and in the projected representation of the sculptured designs given in Fig. 112. Taking as a key the line of dentate figures which appears to represent the teeth of the creature or being embodied, we find that four individuals (or possibly four pairs of the motive) are included. One appears at the crest of the arch (II, Fig. 112), one at the middle of each side (I and III), and one on the concave surface of the base or connecting segment (IV). The row of teeth forms the central feature of each of these units.

I do not expect to be able to identify fully or explain the numerous elements of this design, which evidently represent the various parts—head, mouth, eyes, body, appendages and markings—of the life form embodied, as the conventional transformation is so complete that the specimens at hand do not furnish a satisfactory key. It is highly probable, though, that if all known examples of these yokes were brought together, the designs of one would supplement and explain those of another in such a way that the main devices could be interpreted and referred to their original life motives, and that all the dropped links could be restored.

FIELD COLUMBIAN MUSEUM.



FOUR VIEWS OF A SCULPTURED YOKE FROM MOTZORON



STATE OF VERA CRUZ. ONE-FOURTH ACTUAL SIZE.

At first glance I was impressed with the idea that the creature embodied was the serpent. It appeared that the inner band of the face (upper surface) of the yoke inclosing the aperture, with its S-shaped dividing lines (seen to best advantage in *a*, Pl. LII), might represent the abdominal surface of the reptile, serving to connect the four conventionalized representations of the creature, occupying the outer or convex surface of the object, as a single concept; and possibly that, in addition, the serpent idea might be combined with that of a plaited or twisted band or tie, serving not only to unite the concepts of the outer surface, but to tie up whatever the yoke, in its mysterious use, was employed to hold together or restrain. On looking farther, I found the devices of the convex surface quite varied and complex, and concluded that it might be unwise to try to identify them all with any single creature or concept. The central idea in each unit—represented by the row of teeth—is apparently that of death. This particular treatment of the teeth—the fully uncovered row being shown—characterizes the death's head, a symbol of death among the ancient Mexicans generally. The associated figures evidently represent, more or less definitely, various animal features. All of these features may belong to the supposed figure of death, but they may pertain to other motives associated with the death symbol. When conventional modification has gone as far as it has in this case, the individuality of the features of the original is necessarily, in a great measure, lost; an eye, for example, is a generalized eye; a mouth, a generalized mouth. The normal relations of the parts are also modified to suit the spaces occupied; features that belong together may be separated, others may be joined that belong apart, while others still may be omitted and lost sight of. Notwithstanding these various modifications, rearrangements and omissions, we may assume that the people interested understood the meaning and associations of the symbols as well as when pronounced realism served to recall the original idea to the mind. But the key is wholly unknown to us, and we cannot expect to do much more than to obtain a general idea of the elements employed, and the methods of their assemblage and modification in art.

Taking the simplest possible view of the case in hand, namely, that the central idea involved is the death symbol or concept, embodied in or associated with a reptilian form, a somewhat detailed study of this remarkable yoke may be made. Beginning with the row of teeth, which forms the central feature of each unit of the design, we find its associated forms are much alike in I, II, and III (Fig. 112), but that in IV, on account of the limited space, the forms are much

curtailed. Taking II, which occupies the crest of the arch in the yoke, and following the normal order of features as they occur in the less highly conventionalized reptilian sculptures—as seen for example in the upper figure of Pl. LI—we would have as the most essential idea the mouth, represented by the teeth, and apparently also by a depression at the right, possibly the corner of the mouth, inclosed by curved forms of peculiar character, suggesting the beak of a bird. At the left, however, we fail to find this depression, so that if it really represents the mouth, we must conclude either that a profile view is intended, or that the normal symmetric arrangement of features has given way to the necessity for crowding. Above the mouth we naturally look for the nostrils but find only a single and very pronounced depression; this may be intended to represent the nasal opening as it would appear in the skull, where it is practically a single opening; thus it happens we have an additional hint that the death symbol might have been intended. At the right and left of the rounded pit are rather obscure graded depressions which probably stand for the eyes, or for hollows beneath them, while the relieved, somewhat oval forms overhanging these, would be the lids or the staring eyes themselves. Between these features, and extending from what I take for the nasal ridge to the upper border of the design, are minor markings that probably represent crest plumes, often seen in reptilian representations.

Beneath the row of teeth is a group of devices consisting of three infolding or intertwined parts that appear to represent the tying or interlacing of two forms—apparently reptilian bodies—that issue to the right and left and coil upward enfolding the head. The division of these coils into a narrow and a broader band and the occurrence of various appended features at the right and left and above, probably representing plumes and possibly also rattles, would tend to confirm the idea that the serpent was intended, but the markings of the body suggest the conventional treatment of the body of the frog rather than of the serpent; it is not impossible, therefore, that the frog and serpent motives are combined. At the upper end of the design, as placed in Fig. 112, there is an addition to unit I—a body coil with appendages—that serves apparently merely to fill out the space.

A study of the conventional treatment of the serpent in the onyx tablet design, Fig. 108, will prove instructive in this connection. The body curves of the serpents in the head-dress of the engraved figure show analogies with the supposed serpent bodies in the closed yoke design, and the abbreviated and compounded serpent device, crossing the chest of the onyx tablet figure, resembles the yoke design in several particulars.

Having at hand but a small number of these yokes and possessing few other examples of the symbolic and decorative art of the culture province represented by them, the task of tracing the conventional elements is difficult and unsatisfactory; I shall therefore for the present content myself with presenting two or three additional yokes, in the sculptures of which interesting and suggestive analogies appear.

A handsome yoke described and illustrated by Strebel in his *Alt-Mexico** is of interest in this connection and a face view of the specimen, copied from his Pl. XV, is given in Fig. 113. A portion



FIG. 113. FRONT OR FACE VIEW OF STONE YOKE COPIED FROM STREBEL.

The head of the bird, facing downward, occurs on the outer surface of the arms, the five crest plumes only appearing on the face. Found in the state of Vera Cruz.

of the sculptured design, worked together from the three views of the specimen given in his work, appears in Fig. 114. As seen in the latter illustration the figure of a bird—an eagle or possibly a buzzard—occupies the lower part of each arm. The head is on the outer surface of the arch, and the five plumes of the crown appear on the face. The dotted line in Fig. 114 separates the parts belonging to the outer surface from those of the face. A second and smaller head occupies the crown of the arch, and is seen in the same figure. I wish to call attention first to the manner in which the birds'

* Hamburg, 1885.

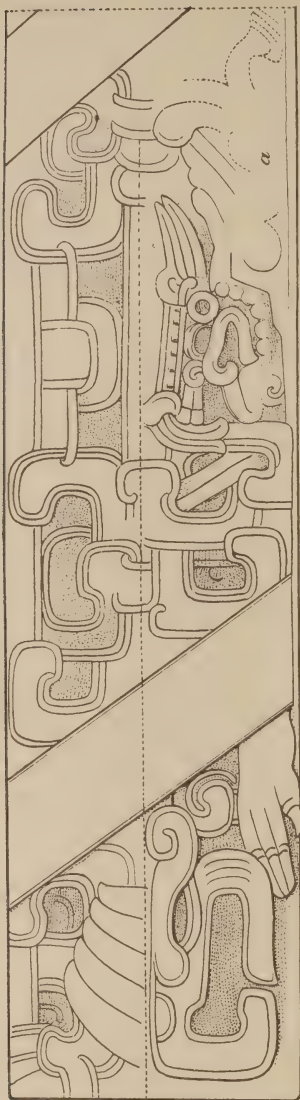


FIG. 114. DESIGN FROM THE STREBEL
YOKE PROJECTED ON A PLAIN
SURFACE.

The birds' heads occur the larger at the base,
and the smaller at the crown
of the arch.

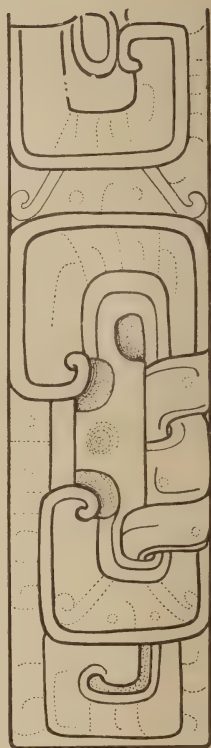


FIG. 115. DEVICES OF THE CLOSED YOKE
SIMPLIFIED TO SHOW ANALOGIES
WITH DESIGNS ON THE
STREBEL YOKE.

heads grade off into formal scroll patterns, and to the fact that a very little additional conventionality of treatment would reduce them to purely formal, though necessarily eccentric, scroll work; and, second,

that these bird motives as well as their attendant scroll devices display striking analogies with the highly conventionalized figures of the closed yoke. These analogies will be made apparent by a comparison of Fig. 114 with portions of the closed yoke design given, in a somewhat simplified form, in Fig. 115. The association of the bird motive with the devices accompanying the death symbol is thus distinctly suggested.

The various devices sculptured on the surfaces of these yokes may thus be studied from the point of view of the life forms embodied, or they may be examined with respect to the symbolism involved. On the latter point, however, we can secure but meager data. We observe that the sculptures vary with the locality and conclude that the symbolism varied with the communities or tribes concerned, and, possibly with successive periods of national history. We see that in one case the devices are simple and in another complex, and surmise that the symbolism was varied and probably in cases complicated. Observing that the frog occurs frequently we conclude that the symbolism may relate to water. Seeing that the bird is sometimes embodied we surmise that there may have been some reference to the air. The feathered serpent also appears and we recall that this favorite concept had to do with both water and air. These are of course mere suggestions, but the present state of our knowledge of Mexican symbolism and its embodiment in art will not justify any attempt at positive determinations.

Turning attention to the objects themselves I have sought hints of symbolism in the shapes, but in nature find no arch save in the rainbow and in the sky; and in art only one suggestive parallel has caught my eye. In the beautiful zapote altar-tablet found in a temple at Tikal, Guatemala, a human figure sits or squats beneath an arch formed of the body of a two-headed feathered serpent; the necks of the monster are bent outward and rest on the ground, and the mouths—curiously elaborated—extend to the right and left. The heads strongly suggest some of those seen in the yokes and it may be that the same or similar ideas are involved. Observing the presence of water and air symbols in these various sculptures I am led to think of the arched forms as possibly symbolizing the rainbow, and of the whole group of subjects as possibly relating largely to the rain god Tlaloc or some of his analogues.

Again these devices may be examined from the point of view of embellishment merely. The symbolic use of life forms in art leads inevitably to the conventional treatment of these forms, and continued use transforms them completely. The graphic symbol stands at one

end of the line and the purely geometric derivatives at the other. These changes are brought about largely by technical agencies, but there is also from first to last a constant supervision by the æsthetic forces, and these gradually take possession of the motives and their application to the objects treated. Symbolism is not necessarily lost as the change from picture to formal device takes place, but when employed in non-symbolic associations confusion of symbols necessarily results and embellishment has everything its own way.

The examples of transformation of symbols furnished by these yokes are especially interesting. The devices of the closed yoke have passed almost completely beyond the limits of the graphic phase, although they are by no means reduced to perfect formality. Realism is lost, but certain original characteristics of shape and arrangement are still present, giving to the whole embellishment a striking individuality. The reliefs are high or low, the curves strong or weak, the lines long or short, involved or simple, according to the parentage of the element embodied. Though the symbolism had certainly not been lost sight of, the æsthetic forces were in almost complete control of the forms of expression.

In the Strebel Yoke the birds' heads are distinctly recognizable, yet a very little additional modification would make identification by the inexperienced eye quite out of the question. The foot associated with one of the heads is still decidedly graphic but the bodies cannot be traced and the spaces naturally taken by them are occupied by derivative scroll work of striking and original character. This example shows that transformations of motives do not take place uniformly, and this mobility is an interesting feature of the progress of conventional modification.

A fine yoke preserved in the National Museum at Washington is sculptured to represent a reptile—probably a frog. The body is treated with a considerable degree of realism, but the head is elaborated in an extraordinary manner, and is more that of a serpent or alligator than that of a frog. The head-crest consists of five plumes which extend up over the face of the yoke as in the Strebel specimen, thus again definitely associating the reptilian and the avian concepts. Similar monsters are common elsewhere and especially in the sculptures of Copan and Quirigua, although in the south the bird element is less prominent or is associated in different ways.

In a yoke belonging to a private collection in the City of Mexico, the form of the frog is developed in a simple manner almost duplicating the specimen shown in Pl. LI, but the body of the creature is entirely covered with beautiful tracery. This tracery is evidently an

elaboration of the scroll-like motives employed in the closed yoke, and in a more decidedly conventionalized form in the bird yoke figured by Strebel. This specimen displays two wholly unique features; it is observed, first, that the tracery, treated in a highly decorative manner, is carried over the entire inner surface of the yoke; and, second, that the end of each arm of the yoke is occupied by a neatly sculptured human head in low relief; these heads are framed in by the tracery volutes, which probably represent the mouth of some mythical creature, since in several other cases human visages similarly placed are seen to be issuing from the mouths of reptiles somewhat realistically treated.

Considering the number of these objects and their importance as works of art it is certainly remarkable that nothing is known of their use, and that they do not appear to be represented in any of the ancient manuscripts or in any of the thousands of subjects engraved or sculptured on stone or painted on or modeled in clay. That they were sacred and symbolic and had some important office to fill in gaming or divination, in rites or ceremonies, requires no proof beyond that furnished by our knowledge of the culture of the people to whom they belonged. Numerous definite uses have been assigned to them but I can see no sufficient reason for adopting any one of these rather than another, and it is quite probable that the real use has not yet been guessed, save perhaps in the most general way.

The idea that these yokes were used in human sacrifice as an aid in restraining the victim while his heart was torn out by the officiating priest has been pretty generally adopted—a result due no doubt to the collar-like shape of the objects, combined with the fact that they occur in the general region in which human sacrifice was so extensively practiced. But there is really nothing in the shape to suggest such use. They could not be adjusted conveniently to any part of the human frame—either the neck, the body, or the limbs, and might prove a decided disadvantage in the work of restraining the unfortunate victim. Brinton suggests* that they may have served the sport-loving natives in the playing of some game of ball. Ernst, and, I believe, Strebel, favor the theory that they were memorial tokens of some great individual achievement worn on certain ceremonial occasions as symbols of dignity or power.

The strange stone collars found on the island of Porto Rico are the only relics of the ancient time that seem to bear any close analogy with these Mexican specimens, and their use is equally a matter of speculation.†

* Science, March 10, 1893.

† Mason, O. T. "The Guesde Collection." Report of the Smithsonian Institution, 1884.

A study of the manner of use, as indicated by the shape, contributes little toward solving the riddle of these yokes. Strebel argues correctly that their normal position is a horizontal one. Few of them are shaped to stand on end without extraneous support and in some cases the ends of the arms are covered with relief sculptures in continuation of the designs of the face and sides. That the horizontal position was the normal one is shown more forcibly still by the position of the animal forms embodied; these are so placed that one face may with safety be regarded as the upper face and the other the under face; the former is covered usually with sculptures and the latter has that portion of the surface which would rest upon a flat support quite plain. It is a noteworthy fact that the under side is narrower than the upper side—as shown in the profiles, Fig. 116—a

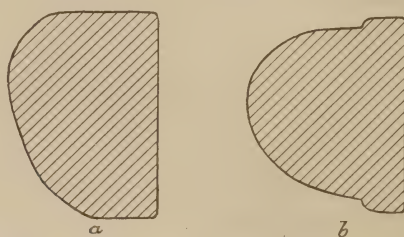


FIG. 116. SECTIONS OF THE YOKES SHOWN IN FIG. 111 AND IN PL. LII.

One fourth actual size.

a. Section of Yoke illustrated in Fig. 111.

b. Section of Yoke illustrated in Pl. LI.

specialization of shape common to all forms and all localities and certainly not without special significance.

Although these yokes seem to stand alone as the product of a particular region, and presumably of a single people or ethnic group, the designs associated with them are not so restricted. The latter belong to a school of aboriginal mythologic art, localized somewhat definitely in the eastern central districts of the great Mexican plateau, but grades off into various neighboring schools. The work does not seem to affiliate so closely, however, with the sculptures of the Valley of Mexico as with those of the Maya-Quiche provinces. In its general style it is repeated throughout Mexico, is echoed in the simple art of our Southern States and again on the North-west Coast; it also has significant affinities with corresponding lines of work in eastern Asia and the Pacific islands.

It would seem that these yokes are most numerous in the states lying directly east of the Valley of Mexico, and few have been found outside of the borders of Puebla, Tlascala and Vera Cruz. The Strebel specimens, as well as the two owned by this Museum, are from

this region. The Dorenberg collection, brought together largely, I believe, at the city of Puebla, contained half a dozen examples. It has been stated that one specimen was found in Oaxaca and another in the Valley of Mexico, but I am inclined to ascribe them all, at least originally, to the one district.

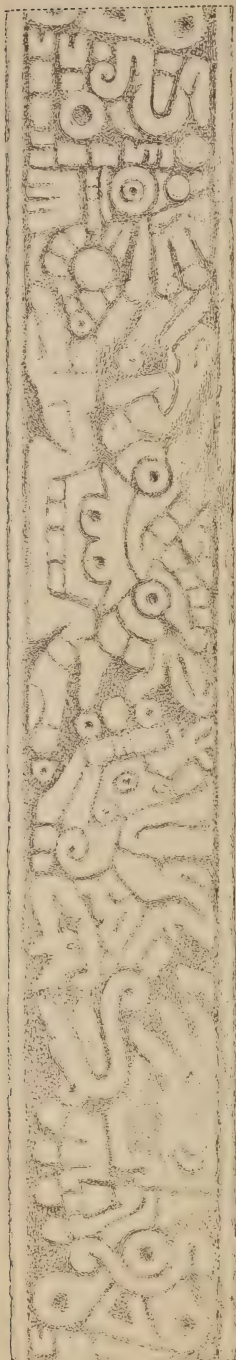
CYLINDER WITH SERPENTS IN RELIEF. The disk or cylinder shown in Pl. LIII-*a* is a handsome example of its class, sculptured from a reddish-gray, compact andesite. It is 7 inches in height and 11 inches in diameter. The upper and lower surfaces or ends are plain and not carefully dressed, leading to the inference that the stone may be the section of a column or of some columnar structure. The periphery is encircled by two feathered serpents in low yet boldly handled relief, their open jaws and protruding tongues meeting on one side (at the left in the figure) and the feathered tips of their tails on the opposite side. The borders above and below imitate plaited fillets.

I have had the sculptured periphery cast and projected on a plain surface so that the whole subject can be seen at a glance, and that the highly artistic arrangement of the feathers, body and rattles, as well as the nice treatment of the relief, may be fully apparent. One of the serpents reproduced from the plaster cast is shown in Fig. 117. This association of a pair of serpents is a very usual one



FIG. 117. FEATHERED SERPENT IN RELIEF, OCCUPYING THE PERIPHERY OF A CYLINDER. throughout Mexico, and even far beyond its limits, and without doubt had special significance to the sculptors. Brinton has expressed the opinion that the association is calendaric, relating possibly to the union of cycles of time.

A comparison of the manner of delineating the serpent in the various regions is interesting; although the differences are striking and varied, the analogies are numerous and marked, suggesting the practical identity of the feathered serpent myth among the whole



group of nations. Among the many peculiar features of the mythic serpent concept is the coil which issues from the corner of the mouth and rests against the jaw. This is a very constant feature, and apparently not traceable to any definite original in the serpent itself or in any other known creature.

ANNULAR STONE WITH RELIEFS. The stone ring shown in Pl. LIII-*b* is made of dark, somewhat scoriaceous andesitic lava, and is $18\frac{1}{2}$ inches in diameter and 10 inches thick. The workmanship is inferior, the shape is not symmetric and the sculpture is extremely crude. The periphery is encircled by the devices drawn out in Fig. 118; these embody varied animal features so poorly defined and so mixed up that little can be made out of them. Among the figures is one of a monster that seems supplied with flippers or jointed claws resembling those of a lobster. The under surface, as placed in the plate, is plain and somewhat rough, while the upper surface is occupied by a cosmic device, very simple and crude, shown in Fig. 119.

STONE BOX WITH RELIEFS. A very well shaped and handsomely sculptured box is illustrated in Pl. LIV. It is made of dark, somewhat porous, basalt, and is $14\frac{1}{2}$ by $15\frac{1}{2}$ inches square and $10\frac{1}{2}$ inches in height. The walls are 2 inches thick and the rim is shaped to accommodate a lid, which is missing. It is evident that the box has been in recent use, probably as a watering trough, for a notch is broken out of the rim on one side as if to fit a supply spout, and a hole has been drilled in the base at the opposite side apparently for drainage. The exterior surfaces are sculptured with much care, as shown in the plate, the figures without doubt being significant. The principal band of devices shows two square compartments on each side, within which are corner projections and a central disk—probably calendaric devices; above is a marginal band with circlets; below are two plain bands and

FIG. 118. BAS-RELIEF FROM PERIPHERY OF THE ANNULAR STONE SHOWN IN *b*, PL. LIII.

PL. LIII. *a.* CYLINDRICAL STONE WITH BAS-RELIEFS.

The upper and lower surfaces of this object are plain, and the periphery is occupied by two conventional feathered serpents in low relief placed face to face, the open mouths meeting as seen at the left. The borders above and below represent plaited bands. One of the sculptured serpents is shown in Fig. 116. Diameter, 11 inches.

PL. LIII. *b.* ANNULAR STONE WITH BAS-RELIEFS.

The upper surface has radiating calendric devices dividing the circle into four and eight parts, and the under surface is plain. The periphery is covered with rude conventional reliefs representing animal forms; these are difficult of identification. The sculptured devices are shown in Figs. 117 and 118. Diameter, 18½ inches.



a



b

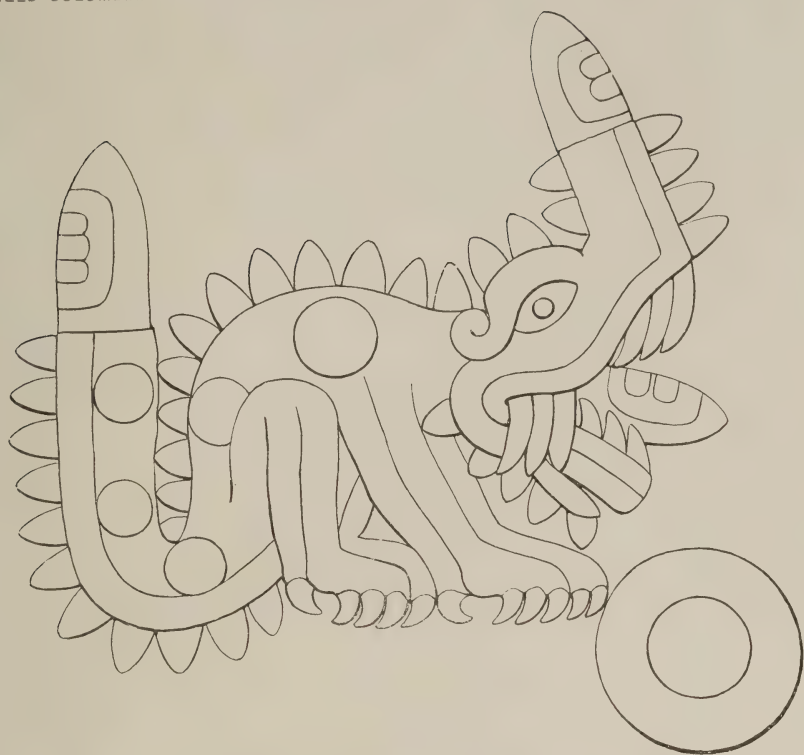
- a.* CYLINDRICAL STONE WITH BAS-RELIEFS.
b. ANNULAR STONE WITH BAS-RELIEFS.

PL. LIV. STONE BASIN WITH CALENDARIC BAS-RELIEF SCULPTURES.

a. Box made of dark, basalt-like rock, and handsomely sculptured. One-fourth actual size.

b. Figure of monster in low relief on bottom of box (inside). Length 9 inches.

The four calendaric devices sculptured on the sides of the box within are shown in Fig. 120.



a



b

STONE BASIN WITH CALENDARIC BAS-RELIEF SCULPTURES. ONE-FOURTH ACTUAL SIZE.

a marginal space occupied by "egg and tongue" figures, probably originating in Mexico in the feathers of the plumed serpent. The four walls within contain neatly sculptured symbols of the four



FIG. 119. DEVICE OCCUPYING THE UPPER SURFACE OF THE STONE RING SHOWN IN PL. LIII-a.

seasons—the rabbit, the house, the flint and the cane (Fig. 120)—while the bottom is occupied by the figure of the flint-bedecked

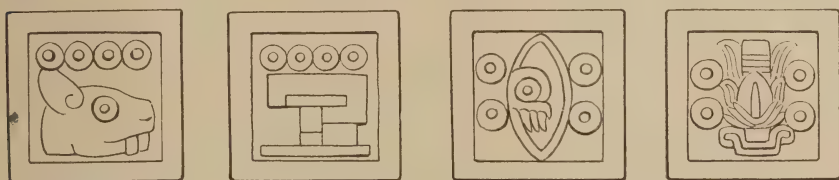


FIG. 120. SYMBOLS OF THE FOUR SEASONS SCULPTURED ON THE INNER WALLS OF THE STONE BOX.

monster of the lower regions, shown in outline in the plate. Doubtless the lid was also handsomely sculptured with devices symbolizing the sun or representing some mythic concept. The specimen was found near the City of Mexico.

HEAD OF DIORITE. A choice bit of lapidary work is illustrated in Pl. LV. It is an ovoid mass of blackish, speckled diorite carved to represent a human head. The height is 8 inches, the width $6\frac{1}{2}$ inches and the depth $5\frac{1}{2}$ inches. The features and embellishments are well worked out and the whole surface is highly polished. The face is framed in by the conical crown above, by decorated pendant bands at the sides and by the necklace beneath the chin. Against the cheeks are carved ear ornaments of the usual annular type. The only

features of the visage having special significance are the four tusk-like pendants issuing from the mouth and covering the chin. These appear to indicate that some rain god, possibly Tlaloc, is represented.

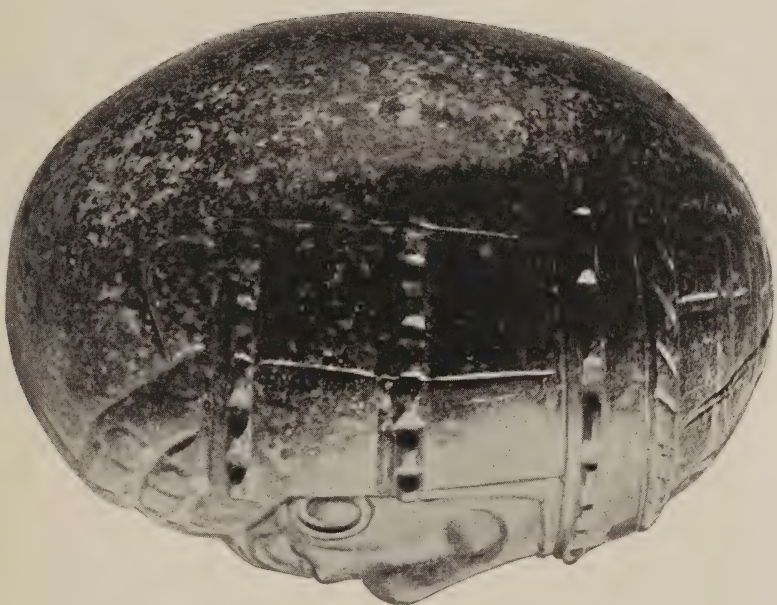
I observe with respect to the manipulation of the surface that different tools have been used according to the form to be defined. A tubular drill, 9-16 of an inch in diameter, was employed to cut the circlets for the ear ornaments and the beads of the necklace. The straight lines are cut with a directness and precision that indicate the use of some well arranged mechanical device, such as a rotary saw, rather than a tool operated by the unaided hands. The grooves and channels have clean-cut surfaces and a polish apparently not secured by an after process, but as the direct result of the shaping operations. The finish of irregular lines and general surfaces is the result of mixed processes, the polish having been given by hand. The back, as indicated in the second figure, is rounded and smooth. A shallow channel extends vertically across the middle, and this is so related to slight depressions above and below as to strongly suggest the idea that the intention was to suspend the stone by a heavy cord, the depressions being just sufficiently pronounced to allow the knottings of the cord to take hold.

As to the object or use of this stone, little can be said, save that it probably served as an amulet. It was found in the year 1896, 15 feet beneath the surface of the dry bed of lake Texcoco by workmen engaged in digging a drainage canal 3 miles long, 50 feet wide and some 25 feet deep, intended to drain lake Chalco into lake Texcoco.

FEATHERED SERPENT IN GREENSTONE. By far the most valuable specimen of early Mexican sculpture so far acquired by the Museum is a feathered serpent, with associated motives, executed in dark green, mottled diorite. The mass of stone may be described as irregularly ovoid, and was probably originally a boulder closely approximating the present general contour. The height is $9\frac{1}{4}$ inches, the depth from front to rear 9 inches, and the greatest thickness from side to side $6\frac{1}{4}$ inches. The entire surface, except the flattish rough-dressed base, is covered with carvings, the motives being the serpent in two phases—one supplementing the other—two human figures, and three independent devices probably symbolic or otherwise significant. These features are shown as completely as possible in the accompanying photographic views, Pl. LVI; a front view is given in *a*, and exhibits the open mouth of the serpent from which looks out a well-sculptured human face of mild and dignified mien, the physiognomy being that of a woman rather than that of

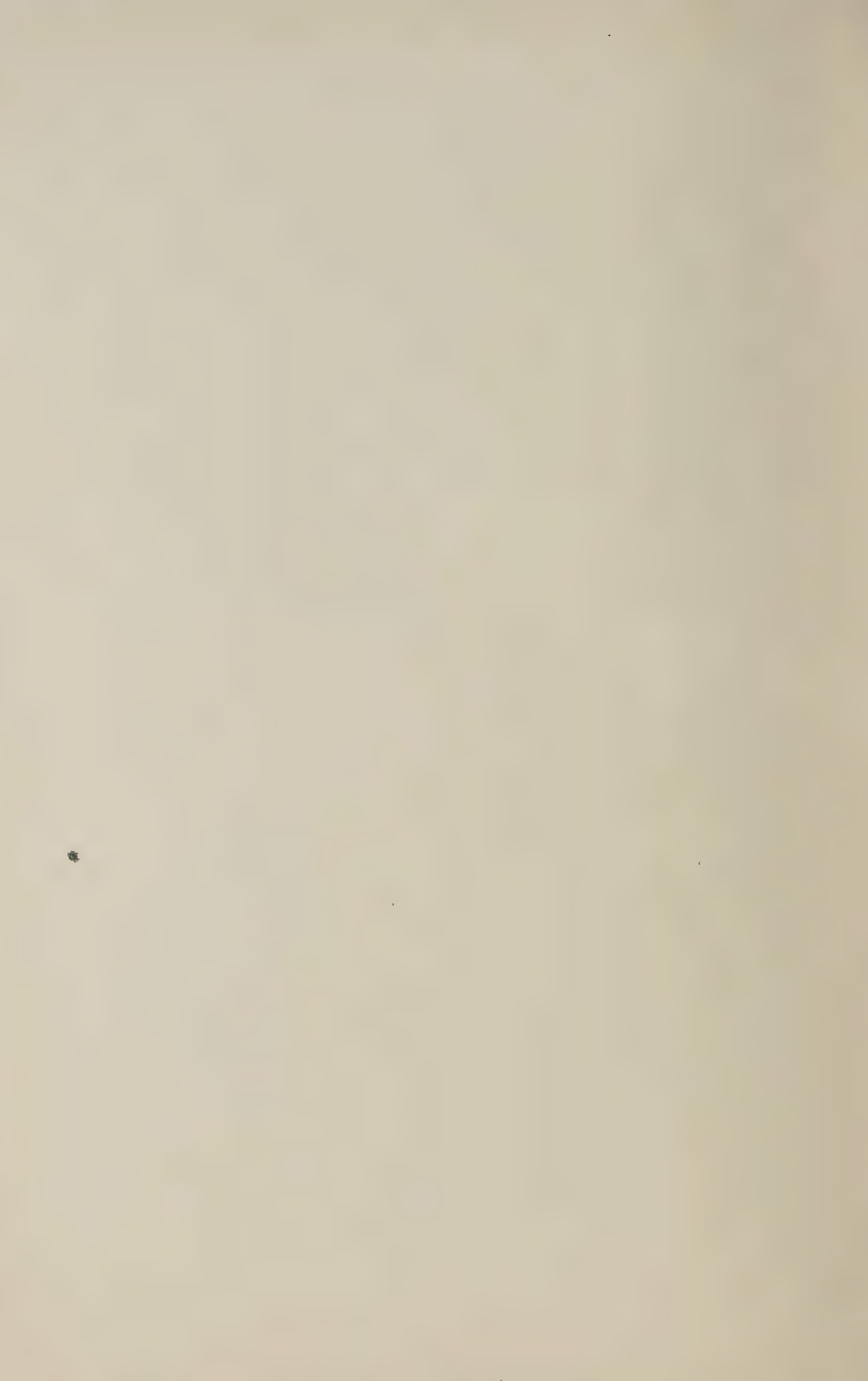


32



ANTHROPOLOGY, PL. LV.

HEAD OF A DIVINITY, CARVED IN BLACK DIORITE. (ONE-HALF ACTUAL SIZE.)



a man. The reptilian features may be a little difficult to trace in the illustration, as they extend partially around the rounded margins of the stone. We may observe first the two curved lines representing the upper lip. These are arched over the human face, pass down the sides and curve outward terminating in coils at the corners of the mouth, while beneath these is the remarkable array of fangs forming, in appearance, a sort of crown to the human face. The lower lip or jaw is represented by three ridges over which hangs the forked tongue of the serpent terminating in two wide coils which reach to the lower margin of the stone. Two tusk-like fangs rise from the lower jaw at the sides of the tongue and rest against the cheeks of the human visage. Above, connecting with the lip lines, is the muzzle, with depressions for the nostrils at the sides; while below these at the right and left are the eyes, over which extend the broad coiled brows partially lost to sight around the margins of the stone.

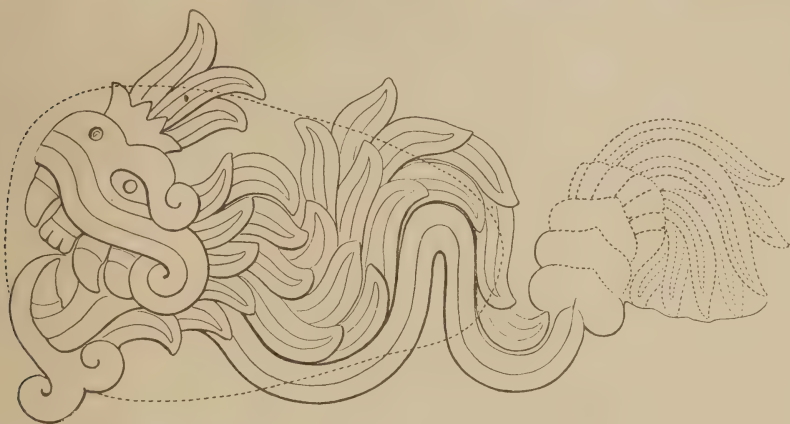


FIG. 121. FEATHERED SERPENT CARVED IN RELIEF ON THE UPPER AND BACK SURFACES OF THE SPECIMEN ILLUSTRATED IN PL. LVI.

The rattle and appended feathers are restored from suggestions of the partially preserved outline.

A second serpent head in profile is carved on the upper surface of the stone, the forked tongue hanging down over the right nostril of the front face. The features of this profile head are much the same as those of the other example; the jaw curves, the fangs, the eye with its brow coil, and the nostril are present, and in addition a crown-like plume rises from the front of the head. Connecting with the head are the gracefully sculptured feathers and the sinuous ventral lines of the body; these pass back over the narrow upper margin of the stone and down the back terminating below in the rattle, now unfortunately nearly all broken away. This serpent figure is shown in outline in Fig. 121.

Very striking features of this sculpture are two human figures occupying the sides of the stone, as shown in *b*, Pl. LVI. These figures are nearly or quite nude, and sit cross-legged with face in profile. Each is engaged in perforating an ear with a bone awl, and tears, in expression of pain, hang pendant on the cheek. One of the figures represents a woman, and the other, judging by the physiognomy, is that of a man.

There remain to be described only three small devices in relief. One is placed in front of and a little above the head of the figure illustrated in *c*, and consists of a circlet below joined to two coils above, suggesting a usual smoke symbol. The two other devices are almost exactly alike, and are placed one in front of each sitting figure as indicated in *b*. Each consists of a conical elevation divided into three segments by cross grooves, and two smaller conical forms—each divided by a single cross groove—extending in banner-like fashion from the vertical ridge as a staff.

The significance of this striking and handsome piece of sculpture is a subject for conjecture, though the principal motive embodied is one common to the native races of a large part of Mexico and Central America. The feathered serpent with the head or face of a human being appearing from the open mouth, is a familiar figure in the sculpture, painting and plastic art of the whole region.

CARVED SHELLS. Two examples of the highly artistic carved shell work of the ancient Mexicans are presented in Pl. LVII. This beautiful material was much prized by all the native tribes and was worked up into a great variety of personal ornaments, among which the gorget or breast-plate was the most striking form. The specimens illustrated are of a pale reddish hue, somewhat whitened on the surface by weathering, and were probably derived from some variety of conch shells. Both are perforated for suspension or attachment. The upper piece is drilled from the back, the hole opening out in the upper margin, and the lower specimen is pierced for attachment rather than for direct suspension, as indicated in the illustration. Both are well carved to represent winged human beings. The bodies are much abbreviated, and the faces are too large for good proportion. The arm and hand of the upper specimen are small and the legs are merely rounded projections. The wings are artistically treated; the two parts or lobes do not quite correspond and it is possible that they represent a compound wing like that of the butterfly rather than the wings of a bird. The head in the lower specimen is crowned by a large and quite elaborate head-dress of plumes, ties and tassels. The body and limbs are but slightly indicated, and a single wing extends back from the shoulders.



FEATHERED SERPENT AND OTHER SUBJECTS, SCULPTURED IN GREENSTONE. ONE-FOURTH ACTUAL SIZE.



CARVED SHELLS REPRESENTING WINGED HUMAN BEINGS. ACTUAL SIZE.

The origin of these objects is unknown. It was stated by a former owner that they came from southern Mexico, but this is doubtful. The style of treatment is new to me. The embodiment of the butterfly in various forms of art was common at San Juan Teotihuacan and it is not unlikely that the specimens belong in the Valley of Mexico.

Though evidently gorgets or breastplates, these specimens belong to a distinct class from the engraved gorgets found occasionally in Mexico, and distributed widely over our southern states. A specimen of the latter class, from Michoacan, belonging to the Abadiano collection, now preserved in the Walker Museum at the Chicago University, is of special interest because of its apparent close relationship with the gorgets of Missouri and Tennessee.* The analogies are especially noteworthy because of the great distance that separates the two regions, and because of the apparent absence of any corresponding forms of art in the vast districts that intervene. That the Ancient Tennesseans used the discoid gorgets with engraved human figures and in large numbers is made apparent by the frequency with which they are found. In Michoacan only the one specimen has been reported, but the manner of delineating the human figure employed is typically Mexican, and, since the natives of the entire country wore similar discoid plates, plain or engraved with appropriate designs, there is no reason for regarding the Michoacan specimen as intrusive. The human figures used in these cases were doubtless of mythological origin and, associated with the wheel-like ornament, probably had some calendaric significance or use. Associated with a form of ornament common to all sections of North America and based on myths and usages common to many peoples, the use of these particular devices may readily have spread from the place of their origin to many distant regions, the forms meanwhile undergoing but slight change. Adopting this idea we would be relieved of the necessity of assuming long distance transfer of objects or the extended migration of peoples, although such exchanges and migrations would not be without precedent.

I began this brief review of the sculptures of the Mexican Plateau without intending to enter into a discussion of the symbolism embodied, and I close with a well-defined impression that such a discussion must necessarily prove, in the present state of our knowledge, wholly unsatisfactory.

If we were dealing with works certainly of Aztec origin we could, perhaps, reasonably expect to make some definite correlations of the

* Starr, Frederick. *Proceedings of the Davenport Academy*, Vol. VI, p. 17.

objects with the myths they illustrate, and even some of the individual deities represented might be named, for there exists a great body of literature bearing more or less directly upon the general subject. Few works are, however, definitely known to be Aztec, though numerous specimens found on the site of the ancient Tenochtitlan are generally regarded as belonging to that people. There are few if any sculptures that can be correlated with the descriptions and allusions of those who wrote of the days of the conquest and saw or knew of the objects as they were originally displayed or used. I doubt if there is a single specimen of ancient Mexican mythological sculpture in any of the museums of the world that can be given a particular native designation with perfect assurance that its application may not some day be challenged.

Notwithstanding this lack of definite correlation of the sculptures with their original names and symbolism, there is yet a vast deal that may be learned or inferred from a study of these Plateau remains. There are recognizable several schools of sculpture representing many nations whose mythologies must have embodied closely analogous groups of conceptions; prominent among these conceptions are the personified forces and elements of the natural world, constituting a numerous and varied pantheon of rulers of earth, air and sky, whose sculptured forms may often be recognized in a general way by the more or less graphic symbols associated with them.

INDEX.

	PAGE.
Adobes, Group of the, Mitla.....	231, 232, 235, 273
Æsthetic development of Nahuatl and other peoples compared	303
Akab-tzib, Chichen-Itza	105, 114, 115
Alban, Monte	216-226
“ Lesser	211-216
Altar, Mugeris island.....	41, 42
“ pieces, Palenque.....	166
Arch, Chichen-Itza	112, 113, 117, 118, 123, 125, 129
“ Cozumel island.....	67
“ Maya	48- 52
“ Monte Alban	222
“ Palenque	160, 174, 176, 192, 193, 194, 200, 201, 204
“ Uxmal	83, 84, 94
Armour, Allison V.....	7, 9, 11, 12, 150, 306
Architect, Yucatec	23
Arroyo, group of the, Mitla	231, 235, 272
Atlantean figures, Yucatan	26, 47, 135
Atlantis, story of.....	17, 20
Ax, iron, Mitla.....	228
Aztec remains.....	298, 299
“ sculpture	301
Balustrades, Chichen-Itza	122, 124
“ Palenque	169, 187
Bancroft, H. H.....	15, 88, 152, 224, 230
Bandelier, A. F.....	15, 229
Basement galleries, quadrangle of	267
Bas-relief sculptures.....	321, 322
“ “ “ Chichen-Itza	26, 47, 104, 127
“ “ “ Palenque	177
Batres, Leopoldo	293
Bird, yoke sculpture.....	315, 316, 318
Box, stone.....	322
Bridge, Palenque.....	205
Brine, Lindsey.....	152
Brinton, D. G.....	19, 319, 321
Building materials, Mitla.....	229, 231, 232
“ “ Palenque	155, 158
“ “ Yucatan	25
Buildings, function of, Palenque.....	180
“ “ “ Yucatan	22
Calcareous deposits, Palenque.....	195, 208
Cancun island	9, 63
Caracol, Chichen-Itza.....	105, 115-120
Carmen, village of	10, 11, 151, 153
Caryatid-atlantean figures, Chichen-Itza.....	134
Catasaja lagoon	10
Catherwood.....	86, 96
Catholic establishment, group of the.....	231, 235, 255, 257
Cedral village, Cozumel island	66
Ceilings, Yucatan.....	38
Cement, Mitla	232, 274
Cenotes.....	18, 101, 102, 105, 136

	PAGE.
Chac-Mool, Yucatan.....	26
Charnay	15, 86, 88, 98, 106, 121, 126, 152, 167, 178, 192, 229, 291, 292
Chiapas, ruins of.....	151-209
Chichanchob, Chichen-Itza	105, 120
Chichen-Itza, ruins of.....	10, 101-137
Chiquito river	10
Citadel group	297
Climate and roof construction.....	162
Coatzacoalcos, village of.....	12
Color, use of, Chichen-Itza	104, 114
“ Palenque	167
“ Mitla	252
Columns, Chichen-Itza.....	122, 123, 127, 130, 132, 134
“ Cozumel Island.....	66
“ El Meco.....	71-73
“ Mitla	239, 259, 260, 261, 262, 268
“ Palenque	163
“ Uxmal	83
“ Yucatan.....	45
“ quadrangle of the, Chichen-Itza	135
“ Mitla.....	259-267
“ group of the, Mitla.....	231, 235, 243, 257-272
“ hall of the, Mitla.....	259-262
“ temple of the, Chichen-Itza.....	133, 134
Cones, temple of the, Chichen-Itza.....	133
Construction, Chichen-Itza.....	103, 108, 111, 112, 117, 118, 123
“ El Meco.....	71-73, 130
“ Mitla	237-243, 261, 268
“ Monte Alban	220, 226
“ Palenque.....	157, 160, 174, 175, 182, 192, 193, 194, 201
“ Uxmal.....	82, 87, 91
Contoy island.....	9, 57
Copper, objects of	287
Cord holders, Palenque	177, 200
“ “ Yucatan.....	38, 40
Corridors, Palenque.....	174
Cozumel island, ruins of	9, 64-69
Cylinder of stone.....	321
Decoration, mural, Chichen-Itza.....	104, 110, 113, 114, 119, 128, 130, 132
“ “ Izamal	98
“ “ Maya	52
“ “ Mexican plateau.....	317, 318
“ “ Mitla	229, 245-257
“ “ Palenque.....	165, 167, 176, 196
“ “ Uxmal	82, 83, 88, 92, 94
“ “ Yucatan	52-55
Defensive motive, Uxmal.....	87
“ “ Yucatan	22
Del Rio.....	152
Dias, Don Carlos.....	11
Dolores village.....	9, 57
Doorways, Chichen-Itza	124, 132-134
“ Mitla.....	237, 240-242, 261, 262
“ Palenque	162, 163, 173, 182, 192, 200
“ Uxmal.....	83, 86, 87
“ Yucatan	40-44
Drill of bone.....	305, 307
Dupaix.....	152, 190, 220, 225
Dwellings, Yucatan.....	22
El Castillo, Chichen-Itza.....	105, 122-127
El Meco, ruins of	69-74

INDEX.

333

	PAGE.
Engraving on stone, Valley of Mexico.....	305, 306
Ernst, Dr. A.....	319
Exploration, progress of.....	15
Façades, Chichen-Itza.....	104, 112, 114, 121, 130
“ Mitla.....	246, 259
“ Palenque.....	177, 195
“ Uxmal.....	87, 88, 92, 93, 95
Farrington, O. C.....	156, 308
Floors, Mitla.....	271, 274
“ Monte Alban.....	213, 226
“ Palenque.....	158
“ Yucatan.....	28, 39
Fortified Hill, Mitla.....	230, 275-279
Frog, sculptured in stone.....	309-319
Gaumer, George F.....	10
Geographical distribution of ruins.....	17
Geological formations of Yucatan.....	17, 18, 101
Grecques, quadrangle of the.....	262-267
Ground plans, Chichen-Itza.....	102, 107, 109, 117, 125
“ “ Mitla.....	235, 236, 237, 268
“ “ Monte Alban.....	226
“ “ Palenque.....	160, 171, 172
“ “ San Juan Teotihuacan.....	291
“ “ Uxmal.....	83, 87, 90
“ “ of temples, Palenque.....	159
“ “ “ Yucatan.....	34- 36
“ “ “ towers, Chichen-Itza.....	117
“ “ “ Palenque.....	160
Gymnasium, Chichen-Itza.....	105, 127-133
“ Uxmal.....	82, 90
“ Yucatan.....	22
Hahn, Herman.....	11
Hammerstones, Mitla.....	285-287
Hieroglyphs, Chichen-Itza.....	114, 115, 121
“ Uxmal.....	96
“ Palenque.....	177, 188, 191
Iglesia, Chichen-Itza.....	106, 112
Implements, stone, copper, Yucatan.....	25
“ for cutting stone, Chichen-Itza.....	104
“ “ “ “ Maya.....	29
“ “ “ “ Mitla.....	251, 284
“ “ “ “ Palenque.....	168
Implements of flaked stone, Mitla.....	285-287
Indians, hostile.....	9
Instruments of precision, Yucatan.....	24
Ituna, yacht, voyage of.....	9- 12
Izamal, ruins of.....	10, 97, 100
Jackson, W. H.....	292
Kingsborough.....	223
Knife of iron, Mitla.....	228
Las Playas, village.....	11
Le Plongeon, Dr. A.....	15, 74, 86, 104, 149
Lime, Yucatan.....	30, 155
“ Chiapas.....	155

	PAGE.
Lintel, Stone, Chichen-Itza.....	114, 123
“ “ Cozumel island.....	68
“ “ Mitla.....	240, 241, 261, 268, 271
“ “ Palenque.....	157
“ wood, Chichen-Itza.....	103, 123, 126, 132
“ “ Mugeris island.....	42, 62
“ “ Palenque.....	157, 161, 163, 174, 178, 193
“ “ Yucatan.....	42, 44
Maler, Teobert.....	149
Map of Chichen-Itza.....	138
“ Mitla.....	231
“ Monte Alban.....	226
“ Palenque.....	153, 208
“ Uxmal.....	96
Maps, sources of.....	16
Marquand, Allan.....	9
Mason, O. T.....	319
Masonry, Chichen-Itza.....	103, 111, 119, 123
“ Mitla.....	233, 261
“ Monte Alban.....	226
“ Palenque.....	155, 170, 175, 180
“ Yucatan.....	27, 28, 30
Matthews, E. O.....	299
Maya architecture.....	20-138
“ arts.....	21
“ books.....	20
“ calendar.....	21
“ culture, grade of.....	20
“ “ origin of.....	20
“ race.....	19
Mayapan, ruins of.....	120
Measurements of ruins.....	16
Mercer, H. C.....	149
Merida, city of.....	10, 80
Mexican government exploration.....	15
Mexico, city of.....	13
Michol, Rio.....	151
Millspaugh, Dr. C. F.....	9
Mitla, ruins of.....	12, 227-279
“ village of.....	227
Miztecs.....	210
Monte Alban.....	12, 211-226
Morlet.....	152
Mosaics, Mitla.....	240, 241, 245-251
Mounds at Progreso.....	79
Mounds.....	211, 213
Mugeris island, ruins of.....	9, 57-63
Mural Tablet building, Palenque.....	178
Maudslay, A. P.....	15, 149, 152, 167, 177, 192
Mortar, Cozumel.....	156
“ Chichen-Itza.....	103
“ Palenque.....	155, 156
“ Uxmal.....	156
“ Yucatan.....	25-30
Mortuary relics, Palenque.....	207, 208
National Museum, sculptured yoke in.....	318
Nevin, Wm.....	211
Northers.....	12
Nunnery, Chichen-Itza.....	106-114
“ Uxmal.....	81, 82, 86-90

	PAGE.
Oaxaca, state and city of.....	12
“ ruins of.....	210-279
Onyx tablet, Valley of Mexico.....	304-309
Orientation, Chichen-Itza.....	112
“ Mitla.....	231
“ Monte Alban.....	226
“ Palenque.....	154, 187
“ and assemblage of buildings, Yucatan.....	24
Orizba, mountain.....	12
Ornament (see decoration).	
Otolum, Rio.....	11, 151
Painted designs, Chichen-Itza.....	128, 132
“ “ Mitla.....	245, 252-256, 273
“ “ Palenque.....	168
“ “ Teotihuacan.....	293
“ “ Yucatan.....	29
Palace Chichen-Itza.....	105-114, 115
“ Governor's, Uxmal.....	81, 82, 90
“ Palenque.....	11, 153, 154, 169-186
Palenque, ruins of.....	10, 151-209
Palisada, village of.....	11
Panoramic view, Chichen-Itza.....	105, 138
“ “ Mitla.....	230
“ “ Monte Alban.....	213, 216, 219, 226
“ “ Palenque.....	153, 169
“ “ Teotihuacan.....	294
“ “ Uxmal.....	81, 96
“ Views.....	15, 16
Pathway of the Dead.....	290
Peabody Museum report.....	149
Perez, Don Jose.....	10
Pigeons, house of, Uxmal.....	81, 82, 95
Pillars, Palenque.....	163, 173
Plaster, Mitla.....	232, 233, 251
“ Monte Alban.....	226
“ Palenque.....	167
Porto Rico, stone yokes from.....	319
Pottery, Mitla.....	288
“ Mugeris Island.....	62
“ Progreso.....	79
“ Teotihuacan.....	293
Progreso, city of.....	10, 79
Puebla city of.....	12
Pyramids, El Meco.....	70-74
“ Cancun island.....	63
“ Chichen-Itza.....	103, 106-116, 122, 136
“ Cozumel island.....	65-69
“ Izamal.....	97, 98
“ Mitla.....	234, 268, 274, 275
“ Monte Alban.....	213, 218, 220
“ Mugeris island.....	60
“ Palenque.....	157, 158, 169, 187, 188, 192, 199
“ Teotihuacan.....	294
“ Uxmal.....	82, 84, 85, 96
“ Yucatan.....	33
Quadrangular arrangement of buildings, Mitla.....	236
“ “ “ Monte Alban.....	217, 226, 229
“ “ “ Uxmal.....	83, 86, 94, 96
Quarries not found at Palenque.....	155
Quarrying of stone, Mitla.....	232, 279-285

	PAGE.
Rau, Charles.....	152
Rings of Stone, Chichen-Itza.....	127, 322
Roadways, Chichen-Itza.....	102
" Teotihuacan.....	296
" Yucatan.....	24
Roof crests, Chichen-Itza.....	121
" Mitla.....	238, 239, 244, 265-268
" Palenque.....	162, 167, 196, 202
" Uxmal.....	95
" Yucatan.....	39
" decoration, Palenque.....	39, 167, 175
" Yucatan.....	39, 41, 95, 121
Roofs, Chichen-Itza.....	103, 111, 115
" Mitla.....	244, 261, 265
" Palenque.....	160-162, 195, 196, 202
" Uxmal.....	83
" Yucatan.....	38
Sanctuaries, Chichen-Itza.....	126, 134
" Palenque.....	165, 188, 194, 195, 201
San Juan Teotihuacan.....	13, 289-298
San Miguel village.....	9, 64
Santo Domingo del Palenque.....	151
Sculpture, Chichen-Itza.....	104, 113, 114, 127, 128, 134
" comparative progress in.....	302, 303
" implements used in.....	29, 30, 104, 168, 251, 279, 284, 302, 306, 309, 324
" materials.....	Nahuatl..... 301
" Maya.....	26, 53, 302, 303
" Mitla.....	245
" Monte Alban.....	220, 223
" Northwest Coast tribes.....	302
" Nahuatl.....	301-328
" Palenque.....	163, 164
" processes, Nahuatl.....	302
" religious inspiration of.....	303
" subjects embodied in, Nahuatl.....	301
" Teotihuacan.....	293, 296
" Yucatan.....	26, 29
Seler, Dr. Eduard.....	149, 243
Serpent embodied in yokes.....	313
" Chichen-Itza.....	116, 122, 124, 127, 129, 130, 132, 133, 134
" Monte Alban.....	220
" Uxmal.....	87
" Valley of Mexico.....	306, 321, 325
" Yucatan.....	47
Shell ornaments.....	326
South Side group.....	234, 235, 274
Stairways, Chichen-Itza.....	109, 111, 116, 118, 122, 128, 129
" El Meco.....	71-73
" Maya.....	32
" Mitla.....	235
" Monte Alban.....	217
" Palenque.....	158, 168, 177, 179, 181, 182, 186, 189
" Teotihuacan.....	295
" Uxmal.....	83, 84, 87
" Yucatan.....	32
Starr, Frederick.....	327
Stephens, J. L.	15, 75, 81, 90, 96, 98, 106, 115, 120, 121, 126, 127, 152, 158, 167, 192
Stone cutting, Chichen-Itza.....	20, 104
" Mitla.....	232, 233, 279-285
" Uxmal.....	82
" Yucatan.....	25, 26

	PAGE.
Stone implements, flaked, Mitla.....	285-287
“ “ used in sculpture (see sculpture).....	
Strebel, yoke described by.....	315
Stucco work, Chichen-Itza.....	104
“ “ Izamal.....	98-100
“ “ Maya.....	27- 29
“ “ Palenque.....	166, 167, 176, 187, 190, 195-198
“ “ Yucatan.....	27- 29
Substructures (see also pyramids).	
“ Mitla.....	234, 268
“ Monte Alban.....	217-226
“ Mugeris Island.....	60
“ Palenque.....	157, 170
“ Teotihuacan.....	291
“ Uxmal.....	81- 96
“ Yucatan.....	30- 33
Subterranean drainage.....	18
“ waterway.....	203-206
Symbolism, Mexican.....	317, 318
“ Yucatec.....	52
Terraces, Chichen-Itza.....	103
“ Mitla.....	234, 268
“ Monte Alban.....	213, 218, 221
“ Palenque.....	155, 158
“ Uxmal.....	87, 90
Tikal, altar sculpture.....	317
Tikul, village of.....	10
Thompson, Edward H.....	9, 12, 80, 86, 96, 101, 121, 127, 207, 281
Tombs, Monte Alban.....	222
“ Palenque.....	206
“ Yucatan.....	22
Towers, Palenque.....	159, 179-186
“ Yucatan.....	26
Tuloom, ruins of.....	9, 75, 78
Tumbala mountains.....	11, 151
Turtles, house of.....	81, 82, 99
Tables, temple of the, Chichen-Itza.....	133
Tablet of the Cross.....	202
“ of the Sun.....	203
“ at Tikal.....	317
Tablets, Palenque.....	166, 178, 188, 202, 203
Temple of the Beau Relief.....	154, 188-191
“ of the Cerro.....	154, 202, 203
“ of the Cross.....	154, 199-202
“ of the Inscriptions.....	154, 186
“ of the Magician.....	84- 86
“ of the Sun.....	154, 192-198
Temples, Chichen-Itza.....	126, 128, 133
“ Cozumel Island.....	65- 69
“ El Meco.....	70- 73
“ Mugeris Island.....	59
“ Palenque.....	150
“ Yucatan.....	22
Tenochtitlan.....	298
Teotihuacan, San Juan.....	289-298
Unit of measurement, Yucatan.....	24
Usumacinta river.....	10, 153
Uxmal, ruins of.....	10, 80- 96
Vera Cruz.....	12

	PAGE.
Vestibules, Chichen-Itza.....	130-132, 134
“ Palenque.....	193, 201
Village sites, Monte Alban.....	215
“ “ Progreso.....	76
Waldeck.....	152, 190, 192
Walker Museum.....	327
Wall niche, Mitla.....	242
Wall openings, Palenque.....	176
“ “ Yucatan.....	45
Waterway, subterranean, Palenque.....	203
Weaving, Mitla.....	228
Williams, Norman.....	9
Windows of Tower, Palenque.....	180
Wood, use of, Chichen-Itza, Maya.....	25
“ “ Mitla.....	232, 238, 239, 244, 261, 265
“ “ Mugeris island.....	62
“ “ Palenque.....	157
“ “ Uxmal.....	83
Yokes, function of, unknown.....	319
“ origin of.....	320
“ sculptured stone.....	309
Yucatan.....	7-137
“ aboriginal history of.....	19
“ conquest of.....	19
“ geologic history of.....	17
“ settlement of.....	18
Zapotecs.....	210, 228

